

**Scientific and Technical
Aerospace Reports**

STAR



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National Aeronautics and
Space Administration
Langley Research Center

**Scientific and Technical
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Also included are two indexes, Subject Term and Personal Author. The Subject Term Index is generated from the *NASA Thesaurus* terms associated and listed with each document.

STAR subject coverage includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of Earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

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[Subject Term Index](#)

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Subject Categories of the Division A. Aeronautics

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

- | | | |
|-----------|--|-----------|
| 01 | Aeronautics (General) | 1 |
| 02 | Aerodynamics | 2 |
| | Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery. For related information, see also <i>34 Fluid Mechanics and Heat Transfer</i> . | |
| 03 | Air Transportation and Safety | 4 |
| | Includes passenger and cargo air transport operations; and aircraft accidents. For related information, see also <i>16 Space Transportation</i> and <i>85 Urban Technology and Transportation</i> . | |
| 04 | Aircraft Communications and Navigation | 6 |
| | Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information, see also <i>17 Space Communications, Spacecraft Communications, Command and Tracking</i> and <i>32 Communications Radar</i> . | |
| 05 | Aircraft Design, Testing and Performance | 8 |
| | Includes aircraft simulation technology. For related information, see also <i>18 Spacecraft Design, Testing and Performance</i> and <i>39 Structural Mechanics</i> . For land transportation vehicles, see <i>85 Urban Technology and Transportation</i> . | |
| 06 | Aircraft Instrumentation | 13 |
| | Includes cockpit and cabin display devices; and flight instruments. For related information, see also <i>19 Spacecraft Instrumentation</i> and <i>35 Instrumentation and Photography</i> . | |
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| | Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft. For related information, see also <i>20 Spacecraft Propulsion and Power</i> , <i>28 Propellants and Fuels</i> , and <i>44 Energy Production and Conversion</i> . | |
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| | Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands. For related information, see also <i>14 Ground Support Systems and Facilities (Space)</i> . | |

Subject Categories of the Division B. Astronautics

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- | | | |
|-----------|---|-------------|
| 12 | Astronautics (General) | 18 |
| | For extraterrestrial exploration, see <i>91 Lunar and Planetary Exploration</i> . | |
| 13 | Astrodynamics | N.A. |
| | Includes powered and free-flight trajectories; and orbital and launching dynamics. | |
| 14 | Ground Support Systems and Facilities (Space) | N.A. |
| | Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators. <i>For related information, see also 09 Research and Support Facilities (Air).</i> | |
| 15 | Launch Vehicles and Space Vehicles | 19 |
| | Includes boosters; operating problems of launch/space vehicle systems; and reusable vehicles. <i>For related information, see also 20 Spacecraft Propulsion and Power.</i> | |
| 16 | Space Transportation | 19 |
| | Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. <i>For related information, see also 03 Air Transportation and Safety and 18 Spacecraft Design, Testing and Performance. For space suits, see 54 Man/System Technology and Life Support.</i> | |
| 17 | Space Communications, Spacecraft Communications, Command and Tracking | 20 |
| | Includes telemetry; space communication networks; astronavigation and guidance; and radio blackout. <i>For related information, see also 04 Aircraft Communications and Navigation and 32 Communications and Radar.</i> | |
| 18 | Spacecraft Design, Testing and Performance | 21 |
| | Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls. <i>For life support systems, see 54 Man/System Technology and Life Support. For related information, see also 05 Aircraft Design, Testing and Performance, 39 Structural Mechanics, and 16 Space Transportation.</i> | |
| 19 | Spacecraft Instrumentation | N.A. |
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| 20 | Spacecraft Propulsion and Power | 22 |
| | Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. <i>For related information, see also 07 Aircraft Propulsion and Power, 28 Propellants and Fuels, 44 Energy Production and Conversion, and 15 Launch Vehicles and Space Vehicles.</i> | |

Subject Categories of the Division C. Chemistry and Materials

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| | Includes physical, chemical, and mechanical properties of laminates and other composite materials. For ceramic materials see <i>27 Nonmetallic Materials</i> . | |
| 25 | Inorganic and Physical Chemistry | 31 |
| | Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry. For related information see also <i>77 Thermodynamics and Statistical Physics</i> . | |
| 26 | Metallic Materials | 47 |
| | Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy. | |
| 27 | Nonmetallic Materials | 57 |
| | Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see <i>24 Composite Materials</i> . | |
| 28 | Propellants and Fuels | 79 |
| | Includes rocket propellants, igniters and oxidizers; their storage and handling procedures; and aircraft fuels. For related information see also <i>07 Aircraft Propulsion and Power</i> , <i>20 Spacecraft Propulsion and Power</i> , and <i>44 Energy Production and Conversion</i> . | |
| 29 | Materials Processing | 81 |
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| 33 | Electronics and Electrical Engineering | 108 |
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| 34 | Fluid Mechanics and Heat Transfer | 122 |
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| 35 | Instrumentation and Photography | 133 |
| | Includes remote sensors; measuring instruments and gauges; detectors; cameras and photographic supplies; and holography. For aerial photography see <i>43 Earth Resources and Remote Sensing</i> . For related information see also <i>06 Aircraft Instrumentation</i> and <i>19 Spacecraft Instrumentation</i> . | |
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| 37 | Mechanical Engineering | 138 |
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| 38 | Quality Assurance and Reliability | 145 |
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Subject Categories of the Division E. Geosciences

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| 44 | Energy Production and Conversion | 184 |
| | Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geo-physical conversion; and windpower. For related information see also <i>07 Aircraft Propulsion and Power</i> , <i>20 Spacecraft Propulsion and Power</i> , and <i>28 Propellants and Fuels</i> . | |
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Subject Categories of the Division F. Life Sciences

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

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Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

53 Behavioral Sciences N.A.

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 Man/System Technology and Life Support 243

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also *16 Space Transportation*.

55 Space Biology N.A.

Includes exobiology; planetary biology; and extraterrestrial life.

Subject Categories of the Division G. Mathematical and Computer Sciences

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| 61 | Computer Programming and Software | 252 |
| | Includes computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM. | |
| 62 | Computer Systems | 272 |
| | Includes computer networks and special application computer systems. | |
| 63 | Cybernetics | 277 |
| | Includes feedback and control theory, artificial intelligence, robotics and expert systems. For related information see also <i>54 Man/System Technology and Life Support</i> . | |
| 64 | Numerical Analysis | 281 |
| | Includes iteration, difference equations, and numerical approximation. | |
| 65 | Statistics and Probability | 288 |
| | Includes data sampling and smoothing; Monte Carlo method; and stochastic processes. | |
| 66 | Systems Analysis | 289 |
| | Includes mathematical modeling; network analysis; and operations research. | |
| 67 | Theoretical Mathematics | 291 |
| | Includes topology and number theory. | |

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| | For precision time and time interval (PTTI) see <i>35 Instrumentation and Photography</i> ; for geophysics, astrophysics or solar physics see <i>46 Geophysics</i> , <i>90 Astrophysics</i> , or <i>92 Solar Physics</i> . | |
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| | Includes elementary and nuclear particles; and reactor theory. For space radiation see <i>93 Space Radiation</i> . | |
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| 77 | Thermodynamics and Statistical Physics | 308 |
| | Includes quantum mechanics; theoretical physics; and Bose and Fermi statistics. For related information see also <i>25 Inorganic and Physical Chemistry</i> and <i>34 Fluid Mechanics and Heat Transfer</i> . | |

Subject Categories of the Division I. Social Sciences

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| 85 | Urban Technology and Transportation | 326 |
| | Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation. For related information see <i>03 Air Transportation and Safety</i> , <i>16 Space Transportation</i> , and <i>44 Energy Production and Conversion</i> . | |

Subject Categories of the Division J. Space Sciences

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- | | | |
|----|---|------|
| 88 | Space Sciences (General) | N.A. |
| 89 | Astronomy | N.A. |
| | Includes radio, gamma-ray, and infrared astronomy; and astrometry. | |
| 90 | Astrophysics | 328 |
| | Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust. For related information see also <i>75 Plasma Physics</i> . | |
| 91 | Lunar and Planetary Exploration | 329 |
| | Includes planetology; and manned and unmanned flights. For spacecraft design or space stations see <i>18 Spacecraft Design, Testing and Performance</i> . | |
| 92 | Solar Physics | 330 |
| | Includes solar activity, solar flares, solar radiation and sunspots. For related information see also <i>93 Space Radiation</i> . | |
| 93 | Space Radiation | 330 |
| | Includes cosmic radiation; and inner and outer earth's radiation belts. For biological effects of radiation see <i>52 Aerospace Medicine</i> . For theory see <i>73 Nuclear and High-Energy Physics</i> . | |

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99 General

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Typical Report Citation and Abstract

- ❶ **19970001126** NASA Langley Research Center, Hampton, VA USA
- ❷ **Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes**
- ❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
- ❹ Mar. 1996; 130p; In English
- ❺ Contract(s)/Grant(s): RTOP 505-68-70-04
- ❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
- ❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10° to 50°, and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65° swept forebody serrations tended to roll together, while vortices from 40° swept serrations were more effective in generating additional lift caused by their more independent nature.
- ❽ Author
- ❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

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SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS

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VOLUME 36, MARCH 16, 1998

01 AERONAUTICS (GENERAL)

19980013135 Louisiana State Univ., Dept. of Electrical and Computer Engineering, Baton Rouge, LA USA
Modeling and Control of Uncertain Systems with Applications to Air Force Problems *Final Report, 1 Sep. 1994 - 31 Aug. 1997*

Gu, Guo-Xiang, Louisiana State Univ., USA; Aug. 1997; 26p; In English

Contract(s)/Grant(s): F49620-94-I-0415

Report No.(s): AD-A332660; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The paper addresses modeling and control of uncertain systems with applications to Air Force problems.

Derived from text

Control Theory; Control Stability

19980016306 National Materials Advisory Board, Washington, DC USA

New Materials for Next-Generation Commercial Transports

1996; 94p; In English

Report No.(s): PB96-181680; NMAB-476; Copyright Waived; Avail: CASI; A05, Hardcopy; A01, Microfiche

The major objective of the study was to identify issues related to the introduction of new materials and the effect that advanced materials will have on the durability and technical risk of future civil aircraft throughout their service life. The report presents new materials and structural concepts that are likely to be incorporated into next-generation commercial aircraft and the factors influencing application decisions.

NTIS

Aircraft Construction Materials; Research and Development; Commercial Aircraft; Transport Aircraft

19980016374 Federal Aviation Administration, Washington, DC USA

Federal Aviation Regulations. Part 43, Maintenance, Preventive Maintenance, Rebuilding and Alteration. Change 2

May 31, 1996; 19p; In English

Report No.(s): PB96-194022; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This change incorporates two amendments: Amendment 43-35, Revision of Authority Citations, effective December 28, 1995, and Amendment 43-36, Revisions to Maintenance and Preventive Maintenance Rule, effective May 31, 1996. Amendment 43-36 revises Sections 43.3, 43.7(d), and 43.11(b) and adds (c)(31) and (c)(32) to Appendix A.

NTIS

Regulations; Maintenance; Aerospace Vehicles; Prevention

19980016571 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

Future Aerospace Technology in the Service of the Alliance, Volume 2, Mission Systems Technologies *Les Technologies Aeronautiques et Spatiales du Futur au Service de L'Alliance Atlantique, Volume 2, Les Technologies des Systemes de Conduite de Mission*

Future Aerospace Technology in the Service of the Alliance; Dec. 1997; 184p; In English; In French; The AGARD Symposium on 'Future Aerospace Technology in the Service of the Alliance', 14-17 Apr. 1997, Palaiseau, France; Also announced as 19980016572 through 19980016587

Report No.(s): AGARD-CP-600-Vol-2; ISBN 92-836-0048-7; Copyright Waived; Avail: CASI; A09, Hardcopy; A02, Microfiche

Advances in sensing and information processing/distribution technologies will enable highly innovative system concepts for achieving unprecedented improvements in military mission capabilities. Assessing those major technology advances, the symposium was structured in five sessions hosting twenty four papers: (1) Mission management concepts, introducing the subject, presenting technological requirements and giving as an example the unmanned tactical aircraft; (2) Sensors and electronic warfare, showing how emerging Radio Frequency and Electro-Optics technologies are able to offer improved situational awareness, but may also defeat apparently reliable weapons; (3) Information and communications systems, stressing the effective blending most likely to occur between market driven and specific military developments, as well as the need to account for the battlespace environment; (4) Information fusion and mission systems integration, demonstrating among others how data fusion which is required for matching the information rate to the human, will result in drastically improving its accuracy and reliability; and (5) System simulation, emphasizing the major role of simulation technologies for cost-effective design of new military systems, evaluation of existing ones, training of operators, and paving the way to the concept of synthetic environments. Based on emerging and rapidly evolving technologies, the presenters built a vision of future weapon systems capable of operating in a diverse range of hostile environments, under all weather conditions, and during day or night. Furthermore, autonomous situation appreciation capability, reliable communication channels and real-time decision aids were discussed, which will drastically reduce the operators' reaction time and prevent overload in a high target and threat density environment. The fruitful interaction with the audience confirmed the unique opportunity offered by this classified symposium to bring together experts working in the relevant sciences as well as the user community, and affiliated either with academia, industry, government organisations, or military services.

Author

Mission Planning; Weapon Systems; Conferences; Electronic Warfare; Military Operations; Systems Engineering; Artificial Intelligence; Decision Making; Pattern Recognition; Global Positioning System; Telecommunication; Aircraft Detection; Avionics

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery. For related information see also 34 Fluid Mechanics and Heat Transfer.

19980013923 Naval Postgraduate School, Monterey, CA USA

Aerodynamic Analysis of a Modified, Pylon-Mounted JSOW/CATM Using Multi-Grid CFD Methods

Pomerantz, Boaz, Naval Postgraduate School, USA; Mar. 1997; 168p; In English

Report No.(s): AD-A331636; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

Computational Fluid Dynamics (CFD) has become a major tool in aerodynamic analysis throughout the aerospace industries, complementary to traditional methods such as wind tunnel testing, and analytical calculations. In this research, an attempt was made to integrate the Similarity and Area Rules with CFD methods. Both tools, the Similarity/Area Rule and CFD are used to derive the characteristics of complicated aerodynamic shapes in the transonic Mach number regime. It was found that the Similarity Rule can only be verified qualitatively. On the other hand, the Area Rule can be more completely verified. The aim was to find ways to minimize the drag of the training configurations of the Air-to-Ground (A/G) weapon, Joint-Standoff-Weapon (JSOW), in its Captive-Air-Training-Missile (CATM) configuration. by analyzing the combination of CATM and Pylon, it was found that the drag of this configuration depends on the average slope of the area cross-section distribution of the afterbody. The CFD tools used were a state-of-the-art grid generation code, GRIDGEN, and a multi-grid integration code, PEGSUS; the configurations were run with the OVERFLOW solver using Euler, as well as Navier-Stokes solutions. For drag optimization, Euler solutions give adequate results, the need for NS solution can be restricted to more intensity viscous analysis.

DTIC

Computational Fluid Dynamics; Aerodynamic Characteristics; Design Analysis; Mach Number; Drag; Education; Aerospace Industry

19980015109 NASA Ames Research Center, Moffett Field, CA USA

Development of High Speed Interferometry Imaging and Analysis Techniques for Compressible Dynamic Stall

Chandrasekhara, M. S., Naval Postgraduate School, USA; Carr, L. W., NASA Ames Research Center, USA; Wilder, M. C., MCAT Inst., USA; Sep. 1997; 13p

Contract(s)/Grant(s): ARO-MIPR-133-94

Report No.(s): AD-A332283; NASA/TM-97-206787; NAS 1.26:206787; ARO-32480-10-EG; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The development of a high speed, phase locked, real time, point diffraction interferometry system for quantitative imaging of unsteady separated flows is described. The system enables recording of up to 224 interferograms of the dynamic stall flow over an oscillating airfoil using a drum camera at rates of up to 40 KHz, controlled by custom designed electronic interlocking circuitry. Several thousand interferograms of the flow have been obtained using this system. A comprehensive image analysis package has been developed for automatic processing of this large number of images. The software has been specifically tuned to address the special characteristics of airfoil flow interferograms. Examples of images obtained using the standard and the high speed interferometry techniques are presented along with a demonstration of the image processing routine's ability to resolve the fine details present in these images.

DTIC

Compressible Flow; Image Processing; Flow Visualization; Unsteady Flow; Aerodynamic Stalling; Image Analysis; Interferometry; Real Time Operation; Separated Flow

19980015746 NERAC, Inc., Tolland, CT USA

Parachutes. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Jan. 1996; In English

Report No.(s): PB96-859509; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning design, fabrication, and testing of parachutes and decelerating devices that use aerodynamic drag. Designs for the canopy, shrouds, and hardware, and operating components, including canopy opening, actuators, staging, reefing, maneuvering, and separation and release mechanisms, are reviewed. Applications include deployment from aircraft for escape or air drop missions, aerial delivery of equipment and munitions, and recovery of drones. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Parachutes

19980016543 NASA Lewis Research Center, Cleveland, OH USA

Experimental Evaluation of the Penalty Associated With Micro-Blowing for Reducing Skin Friction

Hwang, Danny P., NASA Lewis Research Center, USA; Biesiadny, Tom J., NASA Lewis Research Center, USA; Dec. 1997; 12p; In English; 36th; Aerospace Science, 12-15 Jan. 1998, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA

Contract(s)/Grant(s): RTOP 274-00-00

Report No.(s): NASA-TM-113174; NAS 1.15:113174; AIAA Paper-97-0677; E-10938; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A micro-blowing technique (MBT) experiment was conducted in the Advanced Nozzle and Engine Components Test Facility at the NASA Lewis Research Center. The objectives of the test were to evaluate the pressure-drag penalty associated with the MBT and to provide additional information about the porous plates used for micro-blowing. The results showed that 1 of 12 plates tested could reduce the total drag (skin-friction drag plus pressure drag) below a solid flat plate value. The results of this experiment and prior data showed that a total drag reduction below a solid flat plate value was possible. More tests are needed to find an optimal MBT skin and to find a technique to reduce pressure drag.

Author

Skin Friction; Friction Reduction; Drag Reduction

19980016567 Florida State Univ., Dept. of Mechanical Engineering, Tallahassee, FL USA

Thrust-Induced Effects on a Pitching-Up Delta Wing Flow Field: Control of Stalled Wings Final Report, 1 Sep. 1994 - 31 Aug. 1995

VanDommelen, L., Florida State Univ., USA; Nov. 22, 1995; 5p; In English

Contract(s)/Grant(s): F49620-93-I-0568

Report No.(s): AD-A329654; FMRL-TR95-2; AFOSR-TR-97-0416; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Neural network procedures were explored with the objectives to control a delta wing in the non-linear domain. Results show that neural networks are well suited to represent non-linear computed lift and pressure forces on delta wings. A model problem,

the flare maneuver, suggests that neural network controllers can perform well for non-linear systems provided that suitable input and training data are provided to it.

DTIC

Neural Nets; Aerodynamic Stalling; Delta Wings; Lift

19980016874 Japan Atomic Energy Research Inst., Tokyo, Japan

A conceptual design of multidisciplinary-integrated CFD simulation on parallel computers

Onishi, Ryoichi, Japan Atomic Energy Research Inst., Japan; Ohta, Takashi, Japan Atomic Energy Research Inst., Japan; Kimura, Toshiya, Japan Atomic Energy Research Inst., Japan; Nov. 1996; 63p; In Japanese

Report No.(s): JAERI-Data/Code-96-031; DE97-736281; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

A design of a parallel aeroelastic code for aircraft integrated simulations is conducted. The method for integrating aerodynamics and structural dynamics software on parallel computers is devised by using the Euler/Navier-Stokes equations coupled with wing-box finite element structures. A synthesis of modern aircraft requires the optimizations of aerodynamics, structures, controls, operabilities, or other design disciplines, and the R and D efforts to implement Multidisciplinary Design Optimization environments using high performance computers are made especially among the U.S. aerospace industries. This report describes a Multiple Program Multiple Data (MPMD) parallelization of aerodynamics and structural dynamics codes with a dynamic deformation grid. A three-dimensional computation of a flowfield with dynamic deformation caused by a structural deformation is performed, and a pressure data calculated is used for a computation of the structural deformation which is input again to a fluid dynamics code. This process is repeated exchanging the computed data of pressures and deformations between flowfield grids and structural elements. It enables to simulate the structure movements which take into account of the interaction of fluid and structure. The conceptual design for achieving the aforementioned various functions is reported. Also the future extensions to incorporate control systems, which enable to simulate a realistic aircraft configuration to be a major tool for Aircraft Integrated Simulation, are investigated.

DOE

Computerized Simulation; Aircraft Configurations; Multidisciplinary Design Optimization; Parallel Computers; Navier-Stokes Equation; Aircraft Design; Euler Equations of Motion; Computational Fluid Dynamics; Aeroelasticity; Dynamic Structural Analysis; Finite Element Method; Aircraft Structures; Aerodynamics

03

AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents. For related information see also 16 Space Transportation and 85 Urban Technology and Transportation.

19980014450 Embry-Riddle Aeronautical Univ., Daytona Beach, FL USA

General Aviation Night Fatal Accidents Final Report, Jan. 1985 - Dec. 1994

Jorgensen, Richard J., Embry-Riddle Aeronautical Univ., USA; Sep. 1997; 47p; In English

Report No.(s): AD-A330954; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The purpose of this research was to ascertain whether a significantly disproportionate number of general aviation fatal aircraft accidents occur at night. The percentage of all fatal accidents that occur at night, collected over a ten year span, were compared to the percentage of hours flown at night. Research determined that there is a significantly disproportionate number of night fatal accidents. An additional area examined was whether a significantly larger proportion of night (versus day) fatal accidents had inflight encounter with weather as the first occurrence (the first of any number of occurrences or events which contribute to an accident) . The study resolved that a significantly higher percentage of night accidents have inflight encounter with weather as the first occurrence.

DTIC

Aircraft Accidents; General Aviation Aircraft; Weather

19980014521 Army Safety Center, Fort Rucker, AL USA

Flightfax: Army Aviation Risk-Management Information, Volume 26

Nov. 1997; 12p; In English

Report No.(s): AD-A331580; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This periodical deals with all aspects of army Aviation. Some of the topics are: (1) auxillary fuel tank operations; (2) risk management lessons learned; (3) ANVIS maintenance; (4) accidents brief; and (5) aviation messages.

DTIC

Risk; Management Information Systems; Accident Prevention; Flight Safety

19980015208 Eurocontrol Experimental Centre, Bretigny, France

3rd Continental RVSM Real-Time Simulation

Lane, R., Eurocontrol Experimental Centre, France; Deransy, R., Eurocontrol Experimental Centre, France; Seeger, D., Eurocontrol Experimental Centre, France; Jul. 1997; 104p; In English

Report No.(s): PB98-114812; EEC-315; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The S08 Real Time Simulation was the third Continental Reduced Vertical Separation Minima (RVSM) Simulation to be conducted at the EUROCONTROL Experimental Centre (EEC) at Bretigny, France. The aim of the simulation was to continue to study the benefits of the Single and Double Alternate FLOS within the core area of European airspace using a Multi-Air Traffic Control Center (ATCC) environment.

NTIS

Air Traffic Control; Computerized Simulation; Airspace; Civil Aviation

19980015209 Eurocontrol Experimental Centre, Bretigny, France

Space System Safety Case: Impact Study, Volume 1

Fletcher, P. A., Eurocontrol Experimental Centre, France; Jun. 1997; 94p; In English

Report No.(s): PB98-114838; EEC-312-V1; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Volume I of this report reviews the impacts of introducing a Space System Safety Case into the safety regulation of radio navigation services. The report also identifies the need for local (State) and interNational regulatory frameworks to support a Safety Case regime and assists in defining one possible structure and its implications.

NTIS

Radio Navigation; Civil Aviation; Systems Engineering; Safety Factors

19980016626 Commission on Aviation Safety and Security, Washington, DC USA

White House Commission on Aviation Safety and Security Final Report

Gore, A., Commission on Aviation Safety and Security, USA; Feb. 12, 1997; 98p; In English

Report No.(s): PB97-166169; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

The President established the White House Commission on Aviation Safety and Security on August 22, 1996 with a charter to study matters involving aviation matters involving aviation safety and security, including air traffic control and to develop a strategy and security, both domestically and interNationally. The Commission and staff conducted an intensive inquiry into civil aviation safety, security and air traffic control modernization. The publication provides recommendations which should enhance and ensure the continued safety and security of air transportation.

NTIS

Security; Flight Safety; Aircraft Safety

19980016628 National Transportation Safety Board, Washington, DC USA

National Transportation Safety Board Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of February 1996

Feb. 1996; 189p; In English

Report No.(s): PB96-916702; NTSB/IDBOO-96/02; Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

This publication contains all Judge Initial Decisions and Board Opinions and Orders in Safety Enforcement and Seaman Enforcement Cases for February 1996.

NTIS

Safety Management; Transportation

19980016705 NASA Lewis Research Center, Cleveland, OH USA

NASA/FAA/NCAR Supercooled Large Droplet Icing Flight Research: Summary of Winter 1996-1997 Flight Operations

Miller, Dean, NASA Lewis Research Center, USA; Ratvasky, Thomas, NASA Lewis Research Center, USA; Bernstein, Ben, National Center for Atmospheric Research, USA; McDonough, Frank, National Center for Atmospheric Research, USA; Strapp,

J. Walter, Atmospheric Environment Service, Canada; Jan. 1998; 24p; In English; 36th; Aerospace Sciences Meeting and Exhibit, 12-15 Jan. 1998, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA
Contract(s)/Grant(s): RTOP 548-20-23
Report No.(s): NASA/TM-1998-206620; E-11054; NAS 1.15:206620; AIAA Paper 98-0577; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

During the winter of 1996-1997, a flight research program was conducted at the NASA-Lewis Research Center to study the characteristics of Supercooled Large Droplets (SLD) within the Great Lakes region. This flight program was a joint effort between the National Aeronautics and Space Administration (NASA), the National Center for Atmospheric Research (NCAR), and the Federal Aviation Administration (FAA). Based on weather forecasts and real-time in-flight guidance provided by NCAR, the NASA-Lewis Icing Research Aircraft was flown to locations where conditions were believed to be conducive to the formation of Supercooled Large Droplets aloft. Onboard instrumentation was then used to record meteorological, ice accretion, and aero-performance characteristics encountered during the flight. A total of 29 icing research flights were conducted, during which "conventional" small droplet icing, SLD, and mixed phase conditions were encountered aloft. This paper will describe how flight operations were conducted, provide an operational summary of the flights, present selected experimental results from one typical research flight, and conclude with practical "lessons learned" from this first year of operation.

Author

Aircraft Icing; Ice Formation; Real Time Operation; Research Projects

19980016827 National Transportation Safety Board, Washington, DC USA

Annual Review of Aircraft Accident Data. U.S. Air Carrier Operations, Calendar Year 1994

Sep. 18, 1996; 73p; In English

Report No.(s): PB96-145180; NTSB/ARC-96/01; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The publication presents the record of aviation accidents involving revenue operations of U.S. Air Carriers including Commuter Air Carriers and On Demand Air Taxis for calendar year 1994. The report is divided into three major sections according to the federal regulations under which the flight was conducted - 14 CFR 121, Scheduled 14 CFR 135, or Nonscheduled 14 CFR 135. In each section of the report tables are presented to describe the losses and characteristics of 1994 accidents to enable comparison with prior years.

NTIS

Air Transportation; Aircraft Accidents; General Aviation Aircraft

04

AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information see also 17 Space Communications, Spacecraft Communications, Command and Tracking and 32 Communications and Radar.

19980014530 Virginia Transportation Research Council, Charlottesville, VA USA

Case Studies in Collecting Highway Inventory Data with the Global Positioning System Final Report

Brich, S. C., Virginia Transportation Research Council, USA; Fitch, G. M., Virginia Transportation Research Council, USA; May 1996; 79p; In English

Report No.(s): PB96-178868; VTRC-96-R34; Copyright Waived; Avail: CASI; A05, Hardcopy; A01, Microfiche

A number of state departments of transportation, including the Virginia Department of Transportation (VDOT), are developing a geographic information system (GIS) to integrate data and conduct more elaborate analyses that will improve their decision-making capabilities. Research is currently being conducted at the Virginia Transportation Research Council to determine some of the problems associated with the implementation of this relatively new and evolving technology. The collection and development of the data sets required to drive the GIS have been identified as two of the largest expenses associated with GIS implementation. This research looked at the feasibility of using the Global Positioning System (GPS) to collect some of the locational and attribute data required to run VDOT's GIS.

NTIS

Geographic Information Systems; Planning; Highways; Inventories; Transportation

19980015335 Washington Univ., Seattle, WA USA

Automatic Transit Location System Final Report

Dailey, D. J., Washington Univ., USA; Haselkorn, M. P., Washington Univ., USA; Guiberson, K., Washington Univ., USA; Lin, P. J., Washington Univ., USA; Feb. 1996; 55p; In English

Report No.(s): PB96-168836; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This project provides a state-of-the-art review of AVL technologies which highlights King County METRO Transit's AVL System. This project further demonstrated the use of real-time transit information derived from the Metro AVL system to produce a prototypical display of real-time transit coach locations suitable for wide area Advanced Traveler Information (ATIS) use. This project demonstrated the viability of combining multi-agency data with different technology roots in a single development environment that encourages interagency collaboration in the creation of ITS applications and services. This was accomplished in a rich and flexible development environment, created at the University of Washington and used to leverage a proprietary AVL system to a public ATIS prototype.

NTIS

Navigation; Technologies; Real Time Operation; Prototypes; Position (Location); Automated Transit Vehicles

19980015370 SRI InterNational Corp., Menlo Park, CA USA

Precursor Systems Analyses of Automated Highway Systems. Carrier Phase GPS for AHS Vehicle Control: Resource Materials Final Report, Sep. 1993 - Nov. 1994

Galijan, R. C., SRI InterNational Corp., USA; Jan. 1996; 55p; In English

Contract(s)/Grant(s): DTFH61-93-C-00047

Report No.(s): PB96-168778; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report describes the results of a PSA contract awarded to SRI InterNational to analyze applications of advanced Global Positioning System (GPS) measurement techniques to provide data for lateral and longitudinal control of AHS vehicles. The report includes: (1) a review of control sensor requirements suggested by other PSA contractors and AHS researchers; (2) an indepth discussion of GPS principles of operation, advanced techniques for achieving extremely accurate GPS positioning and velocity data, and techniques for augmenting GPS to provide continuous high-accuracy data; (3) current and expected GPS capabilities and performance; (4) a review of other proposed sensor types for providing lateral and longitudinal control data; (5) a description of a notional architecture and operation of an AHS incorporating GPS; and (6) a preliminary evaluation by SRI of GPS operation in a typical AHS roadway environment.

NTIS

Global Positioning System; Lateral Control; Automatic Control; Highways

19980015386 RE/SPEC, Inc., Rapid City, SD USA

Location Referencing System to Support Data Integration Executive Summary

Vogt, T. J., RE/SPEC, Inc., USA; Svalstad, D. K., RE/SPEC, Inc., USA; Chieslar, J. D., RE/SPEC, Inc., USA; Cooper, F. F., Cooper Technology, USA; May 1997; 21p; In English

Report No.(s): PB97-179493; RSI-0771-ES; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An investigation of South Dakota Department of Transportation (SDDOT) location referencing practices and procedures identified the functional requirements of and specific changes that should be implemented to establish a standard location referencing system that will address SDDOT data integration needs. Critical elements of the proposed location referencing system include a relational database to enhance data access and data management capabilities, coordinate transformation interfaces to enable integration of data from diverse referencing systems, and time data attribute to enable historical data management. The study identified 13 discrete location referencing systems in use, provided insight on data sharing needs and uses of location-reference data, and provided a basis for recommended changes that should be implemented to address SDDOT data integration needs. Implementation alternatives were investigated, and a recommended implementation strategy was defined. A relational DBMS was identified as the preferred DBMS based on comparative analyses of system functionality and life cycle cost and SDDOT institutional constraints.

NTIS

Coordinate Transformations; Data Integration; Data Management; Functional Design Specifications; Relational Data Bases; Systems Integration; Transportation

19980016370 Mitre Corp., McLean, VA USA

Time Division Multiple Access (TDMA) System Description: A One-Step Approach to the Future VHF A/G System

Moody, J. C., Mitre Corp., USA; Mar. 1994; 79p; In English

Report No.(s): AD-A324588; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The current very high frequency (VHF) air/ground (A/G) communication system is based on Double Sideband Amplitude Modulation at a channel spacing of 25 kilohertz (kHz). Communications within this band for air traffic control communications is now almost entirely by voice. The system is approaching capacity in the high traffic density areas of Europe resulting in the need for a new more spectrum efficient radio architecture. European States favor transition to an analog channel split system. This paper describes an alternative approach wherein transition would proceed directly to a digital system. This digital system is based on a time division multiple access (TDMA) approach that maintains the current 25 kHz channelization. This alternative approach emphasizes near term implementation of the voice function with data link functionality to follow later.

DTIC

Air Traffic Control; Amplitude Modulation; Digital Systems; High Frequencies; Systems Engineering; Time Division Multiple Access; Very High Frequencies

19980016582 Draper (Charles Stark) Lab., Inc., Director, Guidance Technology Center, Cambridge, MA USA

High Integrity Global Precision Navigation Systems

Schmidt, George T., Draper (Charles Stark) Lab., Inc., USA; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 16p; In English; Also announced as 19980016571; Copyright Waived; Avail: CASI; A03, Hardcopy; A02, Microfiche

This paper will focus on the technology trends for (1) inertial sensors, (2) GPS accuracies, and (3) integrated GPS/INS systems, including considerations of jamming, for military platforms and weapons, that will lead to the high integrity, one meter accuracy global precision navigation systems of the future. For inertial sensors, trend-setting sensor technologies applicable to military systems will be described. They are: fiber-optic gyros, silicon micromechanical gyros, resonating beam accelerometers, and silicon micromechanical accelerometers. A vision of the inertial sensor instrument field, and inertial systems for military applications for the next few decades will be given. GPS specified and observed current accuracies will be described, as well as, planned accuracy improvements due to various stages of the WAGE implementation, inter-satellite ranging, and "all-in-view" tracking. Uses of relative and differential GPS will be discussed. The trend towards tightly-coupled GPS/INS, where both code and carrier tracking loops are aided with inertial sensor information, will be described and the synergistic benefits explored. Some examples of the effects of jamming will be described and expected technology trends to improve system anti-jam capability will be presented.

Author

Global Positioning System; Inertial Navigation; Jamming; Gyroscopes; Military Technology; Inertial Platforms

19980016856 Purdue Univ., School of Civil Engineering, West Lafayette, IN USA

Use of GPS to Enhance Mapping by Photogrammetry Final Report

Feeney, Robert, Purdue Univ., USA; Bethel, James, Purdue Univ., USA; vanGelder, Boudewijn, Purdue Univ., USA; Johnson, Steve, Purdue Univ., USA; May 14, 1996; 89p; In English

Contract(s)/Grant(s): Proj. C-36-72B

Report No.(s): PB96-183678; FHWA/IN/JHRP-95/6; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Purdue entered into a research project with the Indiana Department of Transportation (INDOT) to investigate the use of GPS for their photogrammetric projects. This research addressed system operation, calibration, and coordinate accuracy questions. This project implemented and tested GPS equipment and procedures using the INDOT Cessna 206 airplane, and a Wild RC-8 aerial camera, and borrowed (from the manufacturer) GPS receiving equipment. The camera calibration report contains the calibrated focal length, the radial distortion, the coordinates of the principal points, and the fiducial coordinates.

NTIS

Photogrammetry; Aerial Photography; Global Positioning System; Cameras

05

AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology. For related information see also 18 Spacecraft Design, Testing and Performance and 39 Structural Mechanics. For land transportation vehicles see 85 Urban Technology and Transportation.

19980012711 European Organization for the Safety of Air Navigation, Experimental Center, Bretigny-sur-Orge, France

Model Accuracy Report for the Base of Aircraft Data (BADA), Jul. 1994 - Dec. 1996

Bos, A., European Organization for the Safety of Air Navigation, France; Dec. 1996; 67p; In English

Report No.(s): PB97-140818; EEC-NOTE-29/96; Copyright Waived; Avail: CASI; A04, Hardcopy; A01, Microfiche

An overview is given of the accuracy of 30 aircraft models that have been developed for the Base of Aircraft Data (BADA) over the last 2.5 years. The accuracy for both the aircraft trajectories and the fuel consumption is presented in relation to the reference data that was used.

NTIS

Accuracy; Aircraft Models; Root-Mean-Square Errors; General Overviews

19980012718 Eurocontrol Experimental Centre, Bretigny, France

Aircraft Performance Summary Tables for the Base of Aircraft Data (BADA). Revision 2.5

Bos, A., Eurocontrol Experimental Centre, France; Jan. 1997; 85p; In English

Report No.(s): PB97-140834; EEC/NOTE-3/97; Copyright Waived; Avail: CASI; A05, Hardcopy; A01, Microfiche

A set of aircraft performance summary tables are presented for the 69 aircraft types modeled by the Base of Aircraft Data (BADA) Revision 2.5. For each aircraft type, the performance tables specify the true air speed, rate of climb/descent and fuel flow for conditions of climb, cruise and descent at various flight levels. The performance figures contained within the tables are calculated based on a total-energy model and BADA 2.5 performance coefficients.

NTIS

Aircraft Performance; Climbing Flight; Aircraft Models; Flight Characteristics; Fuel Flow; Airspeed

19980013922 Naval Postgraduate School, Monterey, CA USA

Classification Analysis of Vibration Data from SH-60B Helicopter Transmission Test Facility

Rovenstine, Michael J., Naval Postgraduate School, USA; Mar. 1997; 63p; In English

Report No.(s): AD-A331684; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Health and Usage Monitoring Systems (HUMS) is an emerging technology in helicopter aviation. The USA Navy is evaluating its viability for use on its helicopter fleet. HUMS uses sensors placed throughout the helicopter to monitor and record vibration signals and numerous other aircraft operating parameters. This thesis evaluates the vibration signals recorded by a HUMS system using a statistical technique called tree structured classification. The goal of the analysis is to demonstrate the technique's ability to predict the presence of faulted components in the transmission of the SH-60B autonomously operated in a Helicopter Transmission Test Facility at Naval Air Warfare Center, Trenton, New Jersey. The analysis is implemented in the statistical software package S-plus (Mathsoft Inc., 1995).

DTIC

Helicopters; Vibration; Health; Viability

19980014100 European Organization for the Safety of Air Navigation, Eurocontrol Experimental Centre, Bretigny-sur-Orge, France

User Manual for the Base of Aircraft Data (BADA), Feb. 1996 - Jan. 1997

Bos, A., European Organization for the Safety of Air Navigation, France; Jan. 1997; 90p; In English

Report No.(s): PB97-140842; EEC/NOTE-1/97; Copyright Waived; Avail: CASI; A05, Hardcopy; A01, Microfiche

The Base of Aircraft Data (BADA) provides a set of ASCII files containing performance and operating procedure coefficients for 165 different aircraft types. The coefficients include those used to calculate thrust, drag and fuel flow and those used to specify nominal cruise, climb and descent speeds. User Manual for Revision 2.5 of BADA provides definitions of each of the coefficients and then explains the file formats. Instructions for remotely accessing the files via Internet are also given.

NTIS

User Manuals (Computer Programs); Aerodynamic Coefficients

19980015155 NERAC, Inc., Tolland, CT USA

Drag Reduction Devices for Aircraft (Latest Citations from the Aerospace Database)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863576; NASA/TM-96-206791; NAS 1.26:206790; Copyright Waived; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the modeling, application, testing, and development of drag reduction devices for aircraft. Slots, flaps, fences, large-eddy breakup (LEBU) devices, vortex generators and turbines, Helmholtz resonators, and winglets are among the devices discussed. Contour shaping to ensure laminar flow, control boundary layer transition, or minimize turbulence is also covered. Applications include the wings, nacelles, fuselage, empennage, and externals of aircraft designed for

high-lift, subsonic, or supersonic operation. The design, testing, and development of directional grooves, commonly called riblets, are covered in a separate bibliography. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Drag Reduction; Aerodynamic Drag; Aircraft Structures

19980015162 Eurocontrol Experimental Centre, Bretigny, France

Equivalences Report for the Base of Aircraft Data (BADA)

Boz, A., Eurocontrol Experimental Centre, France; Dec. 1996; 37p; In English

Report No.(s): PB97-141212; EEC/NOTE-30/96-Rev; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Base of Aircraft Data (BADA) provides a set of ASCII files containing performance and operating procedure coefficients for 69 different aircraft types. These are the so-called directly supported models. Besides these 69 aircraft models, there are an additional 96 models that are considered to be equivalent to one of these directly supported models. This report gives an overview of the equivalences added to BADA since the release of the previous version of BADA (2.4).

NTIS

Coefficients; Equivalence

19980015164 Air War Coll., Maxwell AFB, AL USA

The F-22: The Right Fighter for the Twenty-First Century?

Costigan, Michael J., Air War Coll., USA; Aug. 1997; 20p; In English

Report No.(s): AD-A331333; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Quadrennial Defense Review of 1997 may have reaffirmed the need for all three major aircraft modernization programs the F-22, F/A-18E/F, and Joint Strike Fighter but the debate is far from over. The F-22, the most expensive of the three programs, stands out as a lucrative target for budget cutters. Critics are quick to point out that the F-22 was designed during the cold war to defend the North Atlantic Treaty Organization airspace against the Warsaw Pact's numerical superiority. With the cold war long over and the Soviet Union relegated to history, many experts question whether the F-22 is still necessary. They point to the USA's overwhelming dominance in the Persian Gulf War using F-15Cs as evidence. F-22 proponents counter that the world is still a very dangerous place, and the USA needs the F-22 to ensure air superiority. In this study Lt. Col. Michael J. Costigan, USAF, takes a critical look at the F-22 and its role in our military strategy in the twenty-first century. Although the Soviet Union is gone, the USA may well face regional adversaries who will enjoy numerical superiority while the USA deploys its forces. Use of chemical or biological weapons could slow our deployment considerably while forcing other friendly assets in theater to disperse, further limiting their effectiveness. In this scenario, the argument for the F-22 becomes more compelling. Its innovative technologies provide the F-22 with supercruise, stealth, and integrated avionics, and enable it to guarantee the air superiority so necessary to victory.

DTIC

Airspace; Avionics; Military Operations; North Atlantic Treaty Organization (NATO); Persian Gulf; Politics; Warfare; F-22 Aircraft

19980015220 NERAC, Inc., Tolland, CT USA

National Aerospace Plane Thermal Development. (Latest Citations from the Aerospace Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): NASA/TM-96-206845; NAS 1.15:206845; PB96-864210; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)); US Sales Only, Microfiche

The bibliography contains citations concerning thermal properties of the National Aerospace Plane (NASP). Analysis of thermal stress, and methods for determining thermal effects on the plane's supersonic structure are discussed. The citations also review temperature extremes that the vehicle is likely to encounter. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Thermal Stresses; Stress Analysis; Aerospace Planes

19980015616 Applied Research Associates, Inc., Raleigh, NC USA

Interface-Driven Multidisciplinary Design of Large-Scale Aircraft Structures Final Report, 2 Dec. 1995 - 1 Dec. 1996

Oakley, David R., Applied Research Associates, Inc., USA; Rhodes, Graham S., Applied Research Associates, Inc., USA; Kruger, Lonny B., Applied Research Associates, Inc., USA; Feb. 1997; 42p; In English

Contract(s)/Grant(s): F33615-96-C-3206; AF Proj. 3005

Report No.(s): AD-A330548; WL-TR-97-3078; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report presents Phase I research to develop an Interface-Driven Design Manager (IDM) that greatly reduces the design cycle time for affordable composite aircraft. The IDM represents a first attempt to fully integrate powerful new interface element and 3-D interactive graphics technology into a single design environment to automate the assembly and analysis of multicomponent global-local models for faster, more accurate composite airframe design. These emerging technologies have the potential for making multidisciplinary design optimization of large-scale composite structures practical and for providing new levels of design automation that are currently not possible. The IDM provides a graphical environment for rapidly assembling global-local models, as well as other complex multicomponent airframe models, from pre-meshed 'stock' components stored in a relational database, without concern for mesh compatibility. The IDM enables the designer to automatically insert components or regions with a highly refined mesh into the coarse mesh of a global model using interface elements. This provides two substantial benefits: (1) detailed local models can be used without remeshing the entire structure thereby substantially reducing the associated engineering cost; and (2) higher accuracy can be achieved in critical regions without substantial increases in computational cost. Both of these benefits make it practical to use higher-fidelity models earlier in the design cycle so that primary structures which are truly optimized for the application of affordable composites are achieved.

DTIC

Composite Materials; Composite Structures; Computational Grids; Computer Graphics; Multidisciplinary Design Optimization; Relational Data Bases

19980016012 Department of the Navy, Washington, DC USA

Neural Network Based Method for Estimating Helicopter Low Airspeed

Schaefer, Carl G., Jr., Inventor, Department of the Navy, USA; Haas, David J., Inventor, Department of the Navy, USA; McCool, Kelly M., Inventor, Department of the Navy, USA; Oct. 24, 1996; 40p; In English

Report No.(s): AD-D018622; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

The present invention relates generally to virtual sensors and, more particularly, to a means and method utilizing a neural network for estimating helicopter airspeed at speeds below about 50 knots using only fixed system parameters (i.e., parameters measured or determined in a reference frame fixed relative to the helicopter fuselage) as inputs to the neural network.

DTIC

Patent Applications; Neural Nets; Airspeed

19980016091 National Defense Industrial Association, Arlington, VA USA

Enhancing Aircraft Survivability: A Vulnerability Perspective, Volume 1

Oct. 21, 1997; 736p; In English; presented at NSIA Aircraft Survivability Symposium, Monterey, CA, 21-23 Oct 97.

Report No.(s): AD-A331602; No Copyright; Avail: CASI; A99, Hardcopy; A06, Microfiche

These papers were presented at the NSIA Aircraft Survivability Symposium. Some of the topics include: Aircraft Vulnerability: A Survey of Combat and Peacetime Experience; A History of the Survivability Design of Military Aircraft; Airline Safety and Security: An InterNational Perspective; Overview of Structural Damage Tolerance History and Trends; Enhancing Survivability - an Air Force Perspective; Aircraft Fire Safety; Alternatives to Halon: A Status Report; Balancing Survivability Attributes: and The Cost of Mission Success and numerous other topics.

DTIC

Aircraft Survivability; Aircraft Design; Aircraft Safety

19980016129 National Aerospace Lab., Amsterdam, Netherlands

Review of Aeronautical Fatigue Investigations in the Netherlands during the Period March 1993 - March 1995

deJonge, J. B., Editor, National Aerospace Lab., Netherlands; 1997; 46p; In English; 24th; ICAF Conference, 1-2 May 1995, Melbourne, Australia

Report No.(s): PB97-178883; NLR-TP-95102-U; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A brief review is given of work performed in the Netherlands in the field of aeronautical fatigue. Where possible, applicable references are presented.

NTIS

Airframe Materials; Fatigue (Materials); Laminates

19980016574 Science Applications InterNational Corp., McLean, VA USA

Unmanned Tactical Aircraft: A Radically New Tactical Air Vehicle and Mission Concept

Gardner, Pat, Science Applications InterNational Corp., USA; Future Aerospace Technology in the Service of the Alliance; Dec.

1997; Volume 2; 12p; In English; Also announced as 19980016571; Copyright Waived; Avail: CASI; A03, Hardcopy; A02, Microfiche

Unmanned Tactical Aircraft (UTA) is a complete air-power system which enables a general purpose high performance aircraft to perform a full range of lethal missions without the physical presence of a pilot in the aircraft. The system allows the pilot to be virtually present, so that his moral and tactical judgment are retained without exposing him to capture or casualty. Without the pilot, the air vehicle will be optimized for a combination of performance and affordability and can be much less complex and expensive than a comparable manned vehicle. UTAs will be effective in a variety of missions in conflict situations but need not be flown in peacetime beyond minimum maintenance needs; training and mission rehearsal will be done using simulations with the actual virtual pilot interface in the loop. This concept will enable unprecedented affordability in the system. Current estimates are up to 40% reduction in acquisition cost and 50% reduction in operations and support cost. A mix of manned aircraft and UTAS, both exploiting the emerging information architecture for targeting and control provides a distinct new option for National air forces which may be unable to afford a "full" force structure of manned aircraft in the constrained budget environments of the future.

Author

Pilotless Aircraft; Fighter Aircraft; Remotely Piloted Vehicles; Military Operations; Aircraft Design; Human-Computer Interface

19980016775 Technische Univ., Faculty of Aerospace Engineering, Delft, Netherlands

Optimization of Balanced Field Length Performance of Multi-Engine Helicopters

Muenninghoff, N., Technische Univ., Netherlands; Jun. 1997; 184p; In English

Report No.(s): PB97-208326; M-794; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

The main objective of the study is to develop a tool that computes complete trajectories, addressing the rejected (RTO) and continued (CTO) flight simultaneously and including the all-engines-operating phase, so that complete balanced field lengths (BFL) may be optimized directly. The attention is focused on the optimization of Category A runway takeoff operations of multi-engine helicopters according to FAR Part 29. For this purpose, a direct optimization method, based on discretization using collocation, is applied. First, the results of some helicopter take-off optimizations from earlier studies were reproduced using the direct collocation method, using two software packages, DOVNLPAC and Xgesop. Then, an optimization system was developed, using the software package XGesop. An alternative optimization system was developed as well, that handles both continued take-off and rejected take-off in a more efficient way, so that computation time is reduced and the achievable accuracy, increased. A study on aerodynamic helicopter models has also been conducted, to determine an adequate model as a starting point for the optimization systems; possibilities for modifications are also indicated. For the balanced field length optimizations conducted in this study, a two-dimensional point-mass model including rotor rotational dynamics was used as aerodynamic model.

NTIS

Applications Programs (Computers); Helicopter Control; Aircraft Models; Trajectory Optimization; Computerized Simulation; Nonlinear Programming

19980016779 Vought Corp., Dallas, TX USA

Development of Probabilistic Design Methodology for Composite Structures Final Report, Jan. - Dec. 1994

Gary, P. M., Vought Corp., USA; Riskalla, M. G., Vought Corp., USA; Aug. 1997; 95p; In English

Report No.(s): PB98-102007; Rept-2-51200/5R-003; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The objective of the report is to summarize current efforts pertaining to probabilistic analysis of composite structures, describe the Northrop Grumman Commercial Aircraft Division (NGCAD) composite probabilistic analysis methodology, show an example application using the NGCAD approach, and list the type and frequency of typical operations damage to composite components. The following sections of the report contain a review of three unique industry composite structural probabilistic design methods, an overview and example application (Lear Fan 2100 wing) of the NGCAD methodology, and a summary of maintenance information (operational damage) obtained from visits to commercial airline and military composite repair facilities.

NTIS

Commercial Aircraft; Composite Materials; Composite Structures; Grumman Aircraft; Northrop Aircraft; Structural Analysis; Structural Design; Wings

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments. For related information see also 19 Spacecraft Instrumentation and 35 Instrumentation and Photography.

19980015435 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Information Structures for Traceability for Dependable Avionic Systems

Pearson, S., Newcastle-upon-Tyne Univ., UK; Saeed, A., Newcastle-upon-Tyne Univ., UK; Jan. 1997; 28p; In English
Report No.(s): PB97-140958; TRS-567; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this paper, we present a traceability procedure applicable to the development of dependable avionic systems. The procedure was developed by customizing a set of generic information structures that support the recording and manipulation of design rationale. The customization process was directed by an exposition of development practices for dependable avionic systems, in terms of a set of complementary models of a development context. to examine the effectiveness of the procedure and guide further work, a case study based on a high-integrity flight control subsystem is employed.

NTIS

Avionics; Control Systems Design; Controllers; Flight Control

19980016583 Sextant Avionique, Velizy-Villacoublay, France

Impact of New Information Technology and Micro-Techniques on Avionics Functions and Structures

Loise, Dominique, Sextant Avionique, France; Lacroix, Jean-Paul, Thomson-CSF, France; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 6p; In English; Also announced as 19980016571; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

The avionics functions of the 70s and 80s had a growth rate of their embedded processing resources consistent with the progress pace of the semiconductors technology. The avionics functions designed in the early 90's were impacted by information technology, LCC and availability requirements; they are enlightened by the shift from federated to integrated avionics architectures. The micro-techniques, which allow to combine analog sensing and/or actuating with local processing and communication resources, combined to the new trends of information technology in networks (client/server architectures), and the steady increase of semi-conductors technology, may initiate the move of the integrated avionics functions to the distributed micro-systems. These micro-techniques and their application fields are briefly described and their impacts on the architecture and functions are estimated. Some results come from advanced development of the Radar of the next generation, based on Active Array Antenna. Preliminary conclusions are that commercial technology (COTS, Software tools, digital processing, communication protocols) will be usable; an aggregated increase of the communication requirements has to be expected from the distribution of the sensors all over the platform but placing the boundaries at the wrong place while distributing the system may actually worsen the communication issues, as some management and fusion/ consolidation processing resources will have to remain centralized, notwithstanding potential exchanges between the distributed elements. These communication constraints, together with the cooling and power supply distribution issues, remain challenges that the avionics community would have to solve by itself.

Author

Information Systems; Avionics; Technology Assessment; Microinstrumentation; Semiconductor Devices; Aircraft Instruments; Radar Detection

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft. For related information see also 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels, and 44 Energy Production and Conversion.

19980015644 Illinois Inst. of Tech., Dept. of Mechanical and Aerospace Engineering, Chicago, IL USA

Active Control of Supersonic Jet Screech Using MEMS Final Report, 15 Jun. 1996 - 14 Jun. 1997

Naguib, Ahmed, Illinois Inst. of Tech., USA; Nagib, Hassan, Illinois Inst. of Tech., USA; Alnajjar, Emad, Illinois Inst. of Tech., USA; Christophorou, C., Illinois Inst. of Tech., USA; Najafi, Khalil, Illinois Inst. of Tech., USA; Sep. 1997; 8p; In English
Contract(s)/Grant(s): F49620-96-I-0293

Report No.(s): AD-A330573; AFOSR-97-0517TR; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The primary objective of this research is to investigate the usability of mechanical actuators, manufactured using MEMS technology, in the control of high-speed, compressible free shear flows. Appropriate development of MEMS-based actuators for flow control applications must address two issues: (1) the ability of the micron-size amplitude and forces of the MEMS devices to affect larger-scale flows with orders of magnitude higher energy, and (2) the survivability of the fairly fragile actuators when they are exposed to the flow in which they are embedded. Therefore, the current investigation is aimed at testing MEMS actuators for the purpose of controlling supersonic jet screech. For this application, the high-speed, highly-unsteady nature of the flow during screech provides a reasonably harsh environment for testing the survivability of the actuators. Furthermore, the shear layer surrounding the jet at its exit is known to be highly unstable to minute disturbances in the vicinity of the lip of the jet, and hence it is anticipated that the micron-size disturbances introduced by the MEMS actuators will be amplified through the shear layer instability mechanisms to produce large scale effects on the jet itself.

DTIC

Shear Flow; Shear Layers; Sound Waves; Supersonic Jet Flow; Unsteady Flow

19980016714 Boeing Commercial Airplane Co., Seattle, WA USA

Engine Case External Challenges and Opportunities

Miller, Mike, Boeing Commercial Airplane Co., USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 477-500; In English; Also announced as 19980016712; Original contains color illustrations; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

The paper discusses opportunities and challenges as they apply to engine externals in general and cowling seals, component cooling, fire extinguishing and 700 deg wiring in particular. The conclusions reached from the discussion are that the research community needs to review the opportunities for improvements outside the engine case. Airframers are meeting the challenges with expensive test and development programs and analysis capability improvement will benefit the industry.

CASI

Cowlings; Fire Extinguishers; Wiring; Seals (Stoppers); Leakage; Air Cooling; Engine Parts

19980016716 NASA Lewis Research Center, Cleveland, OH USA

Numerical Propulsion System Simulation

Veres, Joseph P., NASA Lewis Research Center, USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 539-554; In English; Also announced as 19980016712; Original contains color illustrations; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

The goal of NPSS is to provide a detailed system simulation for use by engine manufacturers to accurately predict performance early during design. Computer simulations are a primary tool used in the design of new turbine engines. A high fidelity system model can quantify the performance of each engine component and its interactions with other components in a system environment. The improved predictive capability introduced into the design process can reduce the number of design and test iterations in an engine development program, and result in lowering the acquisition cost of engines. Improved performance predictive capability can also benefit the engine system by properly matching components at their peak efficiencies, which in turn can reduce the specific fuel consumption and engine operating costs. The approach used in the development of NPSS is to combine existing validated computer models for fluid mechanics, heat transfer, combustion, structural mechanics and other disciplines into one large system of codes. The NPSS architecture is designed to run the various disciplinary codes in a common simulation environment. The computationally intensive multidisciplinary simulations are to be run on high performance parallel computing platforms to enable rapid affordable computations of engine aerodynamic performance and operability. NPSS is also sometimes referred to as a "Numerical Test Cell for Aerospace Propulsion Systems".

Derived from text

Engine Design; Systems Simulation; Computer Aided Design; Computerized Simulation; Gas Turbine Engines; Jet Propulsion; Multidisciplinary Design Optimization

19980016717 NASA Lewis Research Center, Cleveland, OH USA

Effects of Shrouded Stator Inner-Band Cavity Flows on Multistage Axial-Flow Compressor Performance

Strazisar, Tony, Editor, NASA Lewis Research Center, USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 555-588; In English; Also announced as 19980016712; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

The focus of the work was to investigate the effects that shrouded compressor stator seal cavity flows have on power stream performance, as opposed to studying the details of the cavity flow itself. The work was performed in the NASA Lewis Low Speed Axial Compressor (LSAC) facility, which is patterned after a low speed facility used by GE Aircraft Engines. Our low speed facil-

ity uses the blading design developed by GE under the NASA E3 program. The blading is representative of the rear stages of a multistage machine, so we have relatively high hub-tip radius ratio, low aspect ratio blading. The test compressor is a four stage machine with an IGV. The stators have representative seal cavities representative of high-pressure compressor rear stages with a single seal tooth mounted on the rotor drum. The tip diameter is 48 inches, the hub diameter is 38.4 inches, and the tip speed is about 200 feet per second. Several cavity configurations were investigated along with a variation in the seal tooth clearance itself. These configurations are shown in third figure, where t is the seal clearance in inches and t/h is the seal clearance normalized by blade span. The baseline configuration consists of a single seal tooth on the rotor drum under the stator foot ring. The seal tooth clearance for this cavity configuration was varied by adding a shim under the seal tooth. Three levels of seal tooth clearance (0.67% span, 1.35% span, 2.02% span) were investigated in this manner, with the same clearance set up under each of the four stator rows. Two additional cases were investigated - one with nearly zero seal tooth clearance and one without footing cavities.

Derived from text

Cavity Flow; Stators; Tip Speed; Turbocompressors; Compressor Blades; Seals (Stoppers); Shrouded Turbines; Gas Turbine Engines; Leakage

19980016721 NASA Lewis Research Center, Cleveland, OH USA

Engine Structures Computational Simulation Methods

Chamis, Christos C., NASA Lewis Research Center, USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 649-672; In English; Also announced as 19980016712; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

Select computer codes developed over the years to simulate specific aspects of engine structures are described with typical results to illustrate their capability. These codes include blade impact integrated multidisciplinary analysis and optimization, progressive structural fracture, quantification of uncertainties for structural reliability and risk, benefits estimation of new technology insertion and hierarchical simulation of engine structures made from metal matrix and ceramic matrix composites. Collectively these codes constitute a unique infrastructure readiness to credibly evaluate new and future engine structural concepts throughout the development cycle from initial concept, to design and fabrication, to service performance and maintenance and repairs, and to retirement for cause and even to possible recycling. Stated differently, they provide "virtual" concurrent engineering for engine structures total-life-cycle-cost.

Author

Concurrent Engineering; Engine Design; Life Cycle Costs; Applications Programs (Computers); Error Detection Codes; Multi-disciplinary Design Optimization; Computerized Simulation; Engine Parts

08

AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots. For related information see also 05 Aircraft Design, Testing and Performance.

19980012557 Technische Univ., Delft, Netherlands

Investigation of the Total Energy Control System (TECS) Elevator Innerloop

Tump, R. S., Technische Univ., Netherlands; Mulder, J. A., Technische Univ., Netherlands; Aug. 1996; 173p; In English; Figures in this document may not be legible in microfiche

Report No.(s): PB97-204523; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

The Total Energy Control System (TECS) is a Multi-Input-Multi-Output (MIMO) aircraft control strategy for the longitudinal motion. TECS consists of two parts. An airplane independent part (named TECS outerloops) and an airplane dependent part (named TECS innerloops). First, the Linear Quadratic Regulatory (LQR) method is applied to the design of the elevator innerloop. LQR is a modern design method. Secondly, different elevator innerloops have been investigated, in which the pitch attitude signal is not used. In the last part of the TECS controller is compared with a conventional autopilot - autothrottle controller. A study of literature has been carried out to become familiar with the latest developments on the subject. The designs and performance comparisons are carried out using MATLAB/Simulink. It is concluded that using the LQR method does not give advantages over classical design methods for designing the TECS elevator innerloop. In general, TECS surpasses conventional feedback controllers in performance.

NTIS

Control Systems Design; Aircraft Control; Linear Quadratic Regulator; Examination; Total Energy Systems; MIMO (Control Systems)

19980012558 Technische Univ., Delft, Netherlands

Feasibility Study on the Implementation of a Given Hydraulic Servo Actuator in the Cessna Citation 2 Elevator Flight Control System

Brozius, B. R. F., Technische Univ., Netherlands; Mulder, J. A., Technische Univ., Netherlands; Aug. 1996; 188p; In English; Figures in this document may not be legible in microfiche

Report No.(s): PB97-204515; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This report contains the results of a feasibility study on the implementation of a given hydraulic servoactuator in parallel with conventional Elevator Flight Control System (EFCS) of the Cessna Citation 2. For this purpose, a nonlinear elevator model and servoactuator model is derived. First, the performance diagram for sinusoidally movement of the elevator control surface with a simplified elevator model is presented. Thereafter, dynamic analysis of the two integrated models follows. An autopilot is designed to verify the servoactuator controller design for representative control tasks and responses on turbulence. For the aircraft model, the similar Cessna Citation 500 was used. Simulations were done with the use of the software package DASMAT.

NTIS

Servomechanisms; Aircraft Control; Elevators (Control Surfaces); Feasibility Analysis; Flight Control; Actuators; Hydraulic Equipment

19980015422 Technische Univ., Faculty of Aerospace Engineering, Delft, Netherlands

Cessna Citation 2 Flight Tests: Engine Modeling, Aerodynamic Model Identification and Software Development

Sridhar, J. K., Technische Univ., Netherlands; Fritschy, J., Technische Univ., Netherlands; Hulshoff, S., Technische Univ., Netherlands; Mulder, J. A., Technische Univ., Netherlands; Jun. 1997; 205p; In English

Report No.(s): PB97-204697; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

This disciplinary group of Stability and control of the Faculty of Aerospace Engineering of the Technical University in Delft is active in a big variety of research fields, for example the development of a Fly-by-wire Testbed and the design of a flight simulator (SIMONA). In March 1993, the Faculty of Aerospace Engineering (TUD/LR) together with the National Aerospace Laboratory (NLR) purchased a Cessna Citation 2. This twin-jet aircraft has more or less the same flight envelope (speeds, flight altitudes) as compared to that of the big airliners, like the Boeing 757. Within the disciplinary group of Stability and Control, there was demand for accurate flight test data of the TUD/NLR Cessna Citation 2 Laboratory aircraft. Flight tests were to be performed to provide an accurate unsteady aerodynamic model of the aircraft (for SIMONA), and to provide force and trajectory information for the validation of a Computational Fluid Dynamics (CFD) methods, currently under development.

NTIS

Flight Tests; Unsteady Aerodynamics; Aircraft Models; Cessna Aircraft; Mathematical Models; Aircraft Maneuvers; Flight Control; Aircraft Control

19980015423 Technische Univ., Delft, Netherlands

Experimental Validation of the Handling Qualities Demonstrator

Bakkum, G. J. P., Technische Univ., Netherlands; Mulder, M., Technische Univ., Netherlands; Mulder, J. A., Technische Univ., Netherlands; Jul. 1996; 142p; In English

Report No.(s): PB97-204663; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This report discusses an experiment with the HQD, in which three evaluation pilots were subjected to a pitch angle tracking task for three different configurations of handling qualities. The goal of the experiment was to provide an experimental validation of the HQD software package. In Chapter 2 of this report a brief overview is presented on pilot control behavior in closed-loop control tasks. The next chapter serves as an introduction to the assessment of handling qualities. A short description of the HQD for longitudinal motion is given in Chapter 4. In Chapter 5, the tracking experiment is discussed. A pre-experimental analysis of handling qualities, control behavior, and performance is the subject of Chapter 6. Results of the experiment are treated in Chapter 7. Finally, Chapter 8 gives a discussion of these results, followed by conclusions and recommendations. The graduation assignment that led to this report is included in Appendix E.

NTIS

Applications Programs (Computers); Program Verification (Computers); Pitch (Inclination); Controllability; Aircraft Control; Feedback Control; Flight Control; Tracking (Position)

19980016836 University of Southern California, Dept.of Aerospace Engineering, Los Angeles, CA USA

Aerodynamic Flow vectoring of Wakes and Jets for High Lift Control Final Report, 15 Jun. 1994 - 14 Jun. 1997

Redekopp, Larry G., University of Southern California, USA; Sep. 1997; 53p; In English

Contract(s)/Grant(s): F49620-94-J-0358

Report No.(s): AD-A330588; AFOSR-97-0533TR; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

A methodology has been developed for the aerodynamic flow-vectoring control of wakes on jets. Directional flow control of wakes and jets has been demonstrated without requiring any mechanical motion of the boundaries which constraint or guide the flow. The methodology is based on global instability concepts. The key to the success of this approach is to use local suction to suppress any global instability and then exploit symmetry considerations to produce proportional directional control of this flow.

DTIC

Jet Aircraft; Aerodynamic Characteristics; Directional Control; Thrust Vector Control

09

RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands. For related information see also 14 Ground Support Systems and Facilities (Space).

19980015152 General Accounting Office, Resources, Community and Economic Development Div., Washington, DC USA
Report to the Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives. Airport Privatization: Issues Related to the Sale or Lease of US Commercial Airports

Nov. 1996; 58p; In English

Report No.(s): PB97-210355; GAO/RCED-97-3; B-271960; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The possible sale or lease of commercial airports in the USA to private companies has generated considerable attention in recent years. Such cities as New York and Los Angeles have considered privatizing their airports. proponents claim that privatization would inject much needed capital into the aviation infrastructure because it would make airports more commercially oriented and financially self-sufficient. Opponents say that local governments favor privatization as a way to divert airport revenue intended for developing aviation infrastructure to other municipal purposes, resulting in increased costs for airlines and passengers. The Chairman and Ranking Minority Member of the Subcommittee on Aviation, House Committee on Transportation and Infrastructure, requested that GAO examine (1) the current extent of private sector participation at commercial airports in the USA and foreign countries; (2) the current incentives and barriers to the sale or lease of airports; and (3) the potential implications for major stakeholders, such as the passengers, airlines, and local, state, and federal governments, should airports be sold or leased. This report expands on testimony provided to the Subcommittee in February 1996.

NTIS

Airline Operations; Airports; Civil Aviation; Commercial Aircraft; Congressional Reports; Transportation; USA

19980015154 NERAC, Inc., Tolland, CT USA

Supersonic Wind Tunnels (Latest Citations from the Aerospace Database)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863154; NASA/TM-96-206788; NAS 1.26:206788; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, construction, operation, performance, and use of supersonic wind tunnels. References cover the design of flow nozzles, diffusers, test sections, and ejectors for tunnels driven by compressed air, high-pressure gases, or cryogenic liquids. Methods for flow calibration, boundary layer control, local and freestream turbulence reduction, and force measurement are discussed. Intrusive and non-intrusive instrumentation, sources of measurement error, and measurement corrections are also covered. The citations also include the testing of inlets, nozzles, airfoils, and other components of aerospace vehicles that must operate supersonically. Comprehensive coverage of wind tunnel force balancing systems, and blowdown and supersonic wind tunnels are covered in separate bibliographies. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Supersonic Wind Tunnels

19980015179 National Inst. of Standards and Technology, National Voluntary Lab. Accreditation Program, Gaithersburg, MD USA

National Voluntary Laboratory Accreditation Program 1996 Directory

White, V. R., National Inst. of Standards and Technology, USA; Jan. 1996; 193p; In English

Report No.(s): PB96-162714; NIST/SP-810-ED-1996; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The Directory is published annually and provides a listing of laboratories accredited by the National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP). Approximately 700 laboratories in 19 fields of accreditation are included in the 1996 edition. The Directory lists the name, address, contact person, phone and fax numbers, accreditation renewal date, and scope of accreditation of each accredited laboratory. The Directory contains a description of the NVLAP program, a summary of laboratory participation, and user instructions, followed by five laboratory indexes which are cross-referenced by NVLAP Lab Code: Index A. Listing by Laboratory Name; Index B, Listing by Field of Accreditation; Index C, Listing by State/ Country; Index D. Listing of Testing Laboratories by NVLAP Lab Code; Index E, Listing of Calibration Laboratories by NVLAP Lab Code. The Scopes of Accreditation are provided for testing and calibration laboratories in Indexes D and E, respectively. Current accreditation statuses of participating laboratories may be verified by calling or writing NVLAP.

NTIS

Laboratories; Directories; Standards

19980016143 NERAC, Inc., Tolland, CT USA

Simulators in Training. (Latest Citations from the NTIS Bibliographic Database)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863808; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning research on simulators and simulator technology in a broad range of training settings. Military settings are stressed. Aerial, ground, marine, and submarine operations are investigated. Simulators that allow students to perfect procedures are described, emphasizing training for firefighting, sonar, radar, spacecraft, and sea navigation. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Simulators; Computerized Simulation

12

ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see 91 Lunar and Planetary Exploration.

19980015105 Air Force Scientific Advisory Board, Washington, DC USA

Report on Space Surveillance, Asteroids and Comets, and Space Debris, Volume 1, Space Surveillance

Jun. 1997; 67p; In English

Report No.(s): AD-A332308; SAB-TR-96-04-Vol-1; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This study of Space Surveillance, Asteroids and Comets, and Space Debris is a study that is separable into three parts, each of which is sufficiently complex to be a study of its own. It was requested by Commander, Air Force Space Command, and approved by the Secretary and Chief of Staff of the Air Force. Because increased knowledge of asteroids and comets as well as debris depends on an enhanced space surveillance system, the unifying subject is that of space surveillance. This document reports the Committee's findings on Space Surveillance. Space Control is an important element of future Air Force activity. Space Surveillance that can provide accurate and timely information on every object in space is a fundamental need of Space Control. This study describes today's Satellite Surveillance Network, which mainly consists of sensors deployed for missile attack warning and makes use of technology now several decades old. The present radars, with some modest upgrades and proper calibration, could perform superior earth satellite surveillance, if the processing capability were updated to realize the inherent detection and orbit determination accuracies of the sensors. Deep-space surveillance is dependent on optical sensors deployed in locations around the world that could provide a timely search capability for new or maneuvering objects. This study provides recommendations that can vastly improve Air Force surveillance capabilities at modest cost. Ultimately, Space Surveillance should be conducted from space to obtain worldwide coverage and to ensure timely data without the need for surveillance and tracking stations on foreign soil. This study recommends steps to be taken immediately.

DTIC

Space Surveillance (Spaceborne); Satellite Networks; Aerospace Environments; Reconnaissance Spacecraft

19980016618 NERAC, Inc., Tolland, CT USA

Spacelab Missions (Latest Citations from the NTIS Bibliographic Database)

Nov. 1995; In English; Page count unavailable

Report No.(s): PB96-853940; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning Spacelab missions. Topics include mission reports and analyses of recorded data. Future mission objectives are discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Spacelab

15

LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; operating problems of launch/space vehicle systems; and reusable vehicles. For related information see also 20 Spacecraft Propulsion and Power.

19980015802 Minnesota Univ., Army High Performance Computing Research Center and Aerospace Engineering Mechanics, Minneapolis, MN USA

A Numerical Study of the Injector Region of the 30-mm Regenerative Liquid Propellant Gun

Ray, S. E., Minnesota Univ., USA; Sep. 1997; 55p; In English

Contract(s)/Grant(s): DAAH04-95-C-0008; DA Proj. 1L1-6261B-41-FL

Report No.(s): AD-A330546; ARL-CR-336; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

A numerical study of the flow of liquid propellant (LP) in a regenerative LP gun (RLPG) is described. The model simulates the flow of LP from the liquid reservoir, through the orifice, and into the combustion chamber. The model is based on a space-time finite element method and can automatically handle the deformation of the computational domain. A mesh moving scheme is used to update the mesh at every time step. Two shots of the 30-mm RLPG are studied. One is a small charge shot, and the other is a medium charge shot. The results from the simulations compare well with data from another numerical model of the RLPG and with experimental data. The simulations provide qualitative details of the transient phenomena that occur in the orifice during the firing cycle. The agreement of the results from the model with experimental data provide confidence in the accuracy of the model. The numerical model will be used to study several RLPG shots under a variety of conditions.

DTIC

Combustion Chambers; Computational Grids; Finite Element Method; Liquid Rocket Propellants; Mathematical Models

16

SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. for related information see also 03 Air Transportation and Safety and 18 Spacecraft Design, Testing and Performance. For space suits see 54 Man/System Technology and Life Support

19980014807 NASA Johnson Space Center, Houston, TX USA

STS-87 Day 09 Highlights

Nov. 27, 1997; In English; Videotape: 14 min. 47 sec. playing time, in color, with sound

Report No.(s): NASA/TM-97-113433; BRF-1412I; NONP-NASA-VT-1997125954; No Copyright; Avail: CASI; A02, Videotape-VHS; A22, Videotape-Beta

On this ninth day of the STS-87 mission, the flight crew, Cmdr. Kevin R. Kregel, Pilot Steven W. Lindsey, Mission Specialists Winston E. Scott, Kalpana Chawla, and Takao Doi, and Payload Specialist Leonid K. Kadenyuk continue work with the microgravity science investigations in a special glovebox facility on the middeck. The autonomous operations with the mission's prime payload continue in the payload bay of Columbia with no interaction by the crew required.

CASI

Space Transportation System; Space Transportation System Flights; Spacecrews; Space Shuttle Orbiters; Space Shuttle Missions

19980015095 NASA Johnson Space Center, Houston, TX USA

STS-87 Day 07 Highlights

Nov. 25, 1997; In English; Videotape: 8 min. 38 sec. playing time, in color, with sound

Report No.(s): NASA/TM-97-113446; BRF-1412G; NONP-NASA-VT-1997125967; No Copyright; Avail: CASI; A02, Videotape-VHS; A22, Videotape-Beta

On this seventh day of the STS-87 mission, the flight crew, Cmdr. Kevin R. Kregel, Pilot Steven W. Lindsey, Mission Specialists Winston E. Scott, Kalpana Chawla, and Takao Doi, and Payload Specialist Leonid K. Kadenyuk turn their attention to a variety of experiments inside the Shuttle's cabin. These experiments include the processing of several samples of materials in the glove-box facility in Columbia's middeck; the experiment called PEP, which involves heating samples and then recording the mixture as it resolidifies; and the study of plant growth in space.

CASI

Space Transportation System; Space Transportation System Flights; Spacecrews; Space Flight; Space Shuttles

19980015096 NASA Johnson Space Center, Houston, TX USA

STS-87 Day 06 Highlights

Nov. 24, 1997; In English; Videotape: 18 min. playing time, in color, with sound

Report No.(s): NASA/TM-97-113445; BRF-1412F; NONP-NASA-VT-1997125966; No Copyright; Avail: CASI; A02, Videotape-VHS; A22, Videotape-Beta

On this sixth day of the STS-87 mission, the flight crew, Cmdr. Kevin R. Kregel, Pilot Steven W. Lindsey, Mission Specialists Winston E. Scott, Kalpana Chawla, and Takao Doi, and Payload Specialist Leonid K. Kadenyuk begin the final preparations for the EVA by Scott and Doi. They are to manually capture the SPARTAN Satellite. After this is accomplished they are to test tools and techniques that will be required for the assembly of the InterNational Space Station.

CASI

Space Transportation System; Space Transportation System Flights; Spacecrews; Crew Procedures (Inflight); Space Shuttles; Space Flight

19980015097 NASA Johnson Space Center, Houston, TX USA

STS-87 Day 13 Highlights

Dec. 01, 1997; In English; Videotape: 15 min. 4 sec. playing time, in color, with sound

Report No.(s): NASA/TM-97-113437; BRF-1412M; NONP-NASA-VT-1997125958; No Copyright; Avail: CASI; A02, Videotape-VHS; A22, Videotape-Beta

On this thirteenth day of the STS-87 mission, the flight crew, Cmdr. Kevin R. Kregel, Pilot Steven W. Lindsey, Mission Specialists Winston E. Scott, Kalpana Chawla, and Takao Doi, and Payload Specialist Leonid K. Kadenyuk continue work in the mini laboratory called the microgravity glovebox facility. This facility allows crew members to interactively work with two different experiments today studying the formation of composite materials in an attempt to accurately map the roles of gravity-induced convection and sedimentation on the samples.

CASI

Space Transportation System; Space Transportation System Flights; Spacecrews; Microgravity; Crew Procedures (Inflight)

17

SPACE COMMUNICATIONS, SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation and guidance; and radio blackout. For related information see also 04 Aircraft Communications and Navigation and 32 Communications and Radar.

19980015328 NASA Lewis Research Center, Cleveland, OH USA

Enhancing End-to-End Performance of Information Services Over Ka-Band Global Satellite Networks

Bhasin, Kul B., NASA Lewis Research Center, USA; Glover, Daniel R., NASA Lewis Research Center, USA; Ivancic, William D., NASA Lewis Research Center, USA; vonDeak, Thomas C., NASA Lewis Research Center, USA; Dec. 1997; 12p; In English; 3rd; Ka-Band Utilization Conference, 15-18 Sep. 1997, Sorrento, Italy; Meeting Sponsored in part by IIC-Instituto Internazionale delle Comunicazioni

Contract(s)/Grant(s): RTOP 632-50-5A

Report No.(s): NASA/TM-97-206297; E-10994; NAS 1.15:206297; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Internet has been growing at a rapid rate as the key medium to provide information services such as e-mail, WWW and multimedia etc., however its global reach is limited. Ka-band communication satellite networks are being developed to increase the accessibility of information services via the Internet at global scale. There is need to assess satellite networks in their ability to provide these services and interconnect seamlessly with existing and proposed terrestrial telecommunication networks. In this paper the significant issues and requirements in providing end-to-end high performance for the delivery of information services over satellite networks based on various layers in the OSI reference model are identified. Key experiments have been performed to evaluate the performance of digital video and Internet over satellite-like testbeds. The results of the early developments in ATM and TCP protocols over satellite networks are summarized.

Author

Satellite Networks; Asynchronous Transfer Mode; Communication Networks; Extremely High Frequencies

19980016551 NASA Lewis Research Center, Cleveland, OH USA

Progress Toward Standards for the Seamless Interoperability of Broadband Satellite Communication Networks

Ivancic, William D., NASA Lewis Research Center, USA; Glover, Daniel R., NASA Lewis Research Center, USA; vonDeak, Thomas C., NASA Lewis Research Center, USA; Bhasin, Kul B., NASA Lewis Research Center, USA; Jan. 1998; 8p; In English; 17th; InterNational Communications Satellite Systems Conference, 23-27 Feb. 1998, Yokohama, Japan; Sponsored by American Inst. of Aeronautics and Astronautics, USA

Contract(s)/Grant(s): RTOP 632-50-5A

Report No.(s): NASA/TM-1998-206617; E-11050; NAS 1.15:206617; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The realization of the full potential of the National Information Infrastructure (NI) and Global Information Infrastructure (GII) requires seamless interoperability of emerging satellite networks with terrestrial networks. This requires a cooperative effort between industry, academia and government agencies to develop and advocate new, satellite-friendly communication protocols and modifications to existing communication protocol standards. These groups have recently come together to actively participating in a number of standards making bodies including: the Internet Engineering Task Force (IETF), the Asynchronous Transfer Mode (ATM) Forum, the InterNational Telecommunication Union (ITU) and the Telecommunication Industry Association (TIA) to ensure that issues regarding efficient use of these protocols over satellite links are not overlooked. This paper will summarize the progress made toward standards development to achieve seamless integration and accelerate the deployment of multimedia applications.

Author

Communication Networks; Satellite Networks; Standardization; Broadband

18

SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls. For life support systems see 54 Man/System Technology and Life Support. For related information see also 05 Aircraft Design, Testing and Performance, 39 Structural Mechanics, and 16 Space Transportation.

19980015239 Phillips Lab., Hanscom AFB, MA USA

APEX RAD Documentation Topical Report

Bell, J. T., Phillips Lab., USA; Gussenhoven, M. S., Phillips Lab., USA; Sep. 15, 1997; 39p; In English

Contract(s)/Grant(s): AF Proj. 7601

Report No.(s): AD-A331633; PL-TR-97-2117; ERP-1211; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This technical report documents the APEX RAD software package developed by the Phillips Laboratory, Geophysics Directorate. APEX RAD is a utility that predicts satellite dose accumulation behind four different thicknesses of aluminum (either slab or hemisphere) for specified orbits. Dose accumulation is predicted using empirical dose rate models created using data measured on the APEX (Advanced Photovoltaic and Electronics Experiments) satellite which flew in a 362 by 2544 km elliptical orbit inclined at 700. These dose models have a higher position resolution at low altitudes than the previously released CRRES RAD models. The APEX RAD models give dose rates averaged over the entire APEX mission and for four different levels of magnetospheric disturbance, based on a 15 day (offset by 1 day) running average of linear magnetic activity index, Ap. APEX RAD is best applied to orbits with apogees less than 2500 km, perigees greater than 350 km and inclinations less than 600, for times during

solar cycle minimum. It can be useful for orbits with higher inclinations or lower perigees, but the user must account for any dose that may be received outside the region covered by the model. For higher altitude orbits the use of CRRESRAD is recommended.

DTIC

Solar Radiation; Dosimeters; Software Engineering; Applications Programs (Computers); Magnetospheric Instability

20

SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. For related information see also 07 Aircraft Propulsion and Power, 28 Propellants and Fuels, 44 Energy Production and Conversion, and 15 Launch Vehicles and Space Vehicles.

19980013649 NERAC, Inc., Tolland, CT USA

Magnetohydrodynamic Propulsion. (Latest citations from the Energy Science and Technology Database)

Jan. 1996; In English

Report No.(s): PB96-859715; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning applications of magnetohydrodynamics (MHD) to propulsion systems. Articles discuss theoretical and experimental designs for MHD thrusters and their feasibility, evaluation, and performance. Citations refer to laboratory-scale and full-scale systems with applications to ships, submarines, and spacecraft. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Propulsion System Performance; Magnetohydrodynamics; Bibliographies

19980013902 NASA Lewis Research Center, Cleveland, OH USA

Optical Property Enhancement and Durability Evaluation of Heat Receiver Aperture Shield Materials

deGroh, Kim K., NASA Lewis Research Center, USA; Jaworske, Donald A., NASA Lewis Research Center, USA; Smith, Daniela C., Cleveland State Univ., USA; Jan. 1998; 16p; In English; 36th; Aerospace Sciences Meeting and Exhibit, 12-15 Jan. 1998, Reno, NV, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA

Contract(s)/Grant(s): RTOP 632-1A-1E

Report No.(s): NASA/TM-1998-206623; NAS 1.15:206623; AIAA Paper-98-0270; E-11061; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Under the Solar Dynamic Flight Demonstration (SDFD) program, NASA Lewis Research Center worked with AlliedSignal Aerospace, the heat receiver contractor, on the development, characterization and durability testing of refractory metals to obtain appropriate optical and thermal properties for the SDFD heat receiver aperture shield. Molybdenum and tungsten foils were grit-blasted using silicon carbide or alumina grit under various grit-blasting conditions for optical property enhancement. Black rhenium coated tungsten foil was also evaluated. Tungsten, black rhenium-coated tungsten, and grit-blasted tungsten screens of various mesh sizes were placed over the pristine and grit-blasted foils for optical property characterization. Grit-blasting was found to be effective in decreasing the specular reflectance and the absorptance/emittance ratio of the refractory foils. The placement of a screen further enhanced these optical properties, with a grit-blasted screen over a grit-blasted foil producing the best results. Based on the optical property enhancement results, samples were tested for atomic oxygen and vacuum heat treatment durability. Grit-blasted (Al₂O₃ grit) 2 mil tungsten foil was chosen for the exterior layer of the SDFD heat receiver aperture shield. A 0.007 in. wire diameter, 20 x 20 mesh tungsten screen was chosen to cover the tungsten foil. Based on these test results, a heat receiver aperture shield test unit has been built with the screen covered grit-blast tungsten foil exterior layers. The aperture shield was tested and verified the thermal and structural durability of the outer foil layers during an off-pointing period.

Author

High Temperature Tests; Tungsten; Molybdenum; Solar Dynamic Power Systems; Thermal Vacuum Tests

19980013924 Pennsylvania State Univ., Dept. of Aerospace Engineering, University Park, PA USA

Contributions of Shear Coaxial Injectors to Liquid Rocket Motor Combustion Instabilities Final Report, 1 Mar. 1995 - 30 Jun. 1997

Micci, Michael M., Pennsylvania State Univ., USA; Oct. 24, 1997; 12p; In English

Contract(s)/Grant(s): F49620-95-1-0184; AF Proj. 2308

Report No.(s): AD-A331635; AFOSR-TR-97-0586; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Acoustic oscillations were induced in a subscale liquid rocket engine that burned liquid oxygen and gaseous hydrogen as propellants. The oscillations in the chamber were forced by a rotating gear just downstream of the nozzle throat. High frequency data were acquired for pressure and velocity via a pressure transducer and a magnetic flowmeter. The magnetic flowmeter obtains the acoustic gas velocity by measuring the voltage induced by the ionized combustion products moving through an externally imposed magnetic field. A cross correlation was performed on the velocity and pressure signals to determine the amplitude and phase difference of the two signals. A linearized one-dimensional acoustic model was developed to simulate the mean and unsteady flow within the chamber with mass and energy addition. The phase difference between unsteady pressure and velocity was determined from the model and fit to match the phase difference measured by the experiments. The points where the modeled and experimental phase differences agreed determined the real part of the propellant evaporation and combustion pressure and velocity coupled response functions.

DTIC

Acoustic Velocity; Oscillations; Liquid Propellant Rocket Engines; Liquid Oxygen; Combustion; Stability; Magnetic Fields; Pressure Sensors

19980015137 California Univ., San Diego, La Jolla, CA USA

Fundamental of Acoustic Instabilities in Liquid-Propellant Rockets *Final Report, Period ending 14 Feb. 1997*

Williams, F. A., California Univ., San Diego, USA; Apr. 14, 1997; 7p; In English

Contract(s)/Grant(s): F49620-94-I-0166

Report No.(s): AD-A329657; AFOSR-TR-97-0355; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The objective of this research was to improve understanding of the mechanisms by which flow, mixing and combustion processes are coupled to acoustic fields in liquid propellant rocket motors. Particular attention was focused on analyses of amplification mechanisms coupled with finite rate chemical reactions by use of numerical and analytical methods. A theoretical explanation of empirical correlation of instability boundaries for engine test results for LOX/RP-1 rockets was developed on the basis of amplification by finite rate chemical reactions in strained mixing layers. In addition, a new numerical computation of nonlinear amplification mechanisms in LOX/GH₂ combustion suggested a possible explanation of threshold phenomena found in liquid propellant rockets.

DTIC

Acoustic Instability; Liquid Propellant Rocket Engines; Liquid Rocket Propellants; Numerical Analysis; Combustion Physics; Chemical Reactions

19980016322 NASA Lewis Research Center, Cleveland, OH USA

Performance Evaluation of the SPT-140

Manzella, David, NYMA, Inc., USA; Sarmiento, Charles, NASA Lewis Research Center, USA; Sankovic, John, NASA Lewis Research Center, USA; Haag, Tom, NASA Lewis Research Center, USA; Dec. 1997; 10p; In English; 25th; Electric Propulsion Conference, 24-28 Aug. 1997, Cleveland, OH, USA; Sponsored by Electric Rocket Propulsion Society, USA

Contract(s)/Grant(s): NAS3-27186; RTOP 632-1B-1B

Report No.(s): NASA/TM-97-206301; NAS 1.15:206301; IEPC-97-059; E-10998; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

As part of an on-going cooperative program with industry, an engineering model SPT-140 Hall thruster, which may be suitable for orbit insertion and station-keeping of geosynchronous communication satellites, was evaluated with respect to thrust and radiated electromagnetic interference at the NASA Lewis Research Center. Performance measurements were made using a laboratory model propellant feed system and commercial power supplies. The engine was operated in a space simulation chamber capable of providing background pressures of 4×10^{-6} Torr or less during thruster operation. Thrust was measured at input powers ranging from 1.5 to 5 kilowatts with two different output filter configurations. The broadband electromagnetic emission spectra generated by the engine was also measured for a range of frequencies from 0.01 to 18,000 Mhz. These results are compared to the noise threshold of the measurement system and MIL-STD-461C where appropriate.

Author

Electric Propulsion; Spacecraft Propulsion; Hall Effect; Engine Tests; Thrust Measurement

19980016658 NASA Lewis Research Center, Cleveland, OH USA

RHETT/EPDM Flight Hollow Cathode

Manzella, David, NYMA, Inc., USA; Patterson, Michael, NASA Lewis Research Center, USA; Pastel, Michael, Gilcrest Electric, USA; Dec. 1997; 8p; In English; 25th; Electric Propulsion Conference, 24-28 Aug. 1997, Cleveland, OH, USA; Sponsored by Electric Rocket Propulsion Society, USA

Contract(s)/Grant(s): NAS3-27186; NAS3-27351; RTOP 632-1B-1B

Report No.(s): NASA/TM-97-206302; NAS 1.15:206302; IEPC-97-103; E-10999; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Under the sponsorship of the BMDO Russian Hall Electric Thruster Technology program two xenon hollow cathodes, a flight unit and a flight spare were fabricated, acceptance tested and delivered to the Naval Research Laboratory for use on the Electric Propulsion Demonstration Module. These hollow cathodes, based on the InterNational Space Station plasma contactor design, were fabricated at the NASA Lewis Research Center for use with a D-55 anode layer thruster in the first on-orbit operational application of this technology. The 2.2 Ampere nominal emission current of this device was obtained with a xenon flow rate of 0.6 mg/s. Ignition of the cathode discharge was accomplished through preheating the active electron emitter with a resistive heating element before application of a 650 volt ignition pulse between the emitter and an external starting electrode. The successful acceptance testing of the Electric Propulsion Demonstration Module utilizing these cathodes demonstrated the suitability of cathodes based on barium impregnated inserts in an enclosed keeper configuration for use with Hall thruster propulsion systems.

Author

Hollow Cathodes; Electric Propulsion; Hall Effect; Performance Tests

19980016688 Institut National Polytechnique, Toulouse, France

Electromagnetic Behavior of a Modular MHD Thruster during Normal and Damaged Operating Conditions

Brunet, Y., Institut National Polytechnique, France; Kom, C. H., Institut National Polytechnique, France; 1995; 6p; In English Report No.(s): PB96-126461; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The magnetic field of an annular MHD thruster made of independent superconducting modules has been studied with analytical and numerical methods. This configuration allows to obtain large magnetized volumes and high induction levels with rapidly decreasing leakage fields. When some inductors are out of order, the thruster remains still operational, but the leakage fields increase in the vicinity of the failure. For given structural materials and superconductors, it is possible to determine the size of the conductors in order to reduce the electromagnetic forces and the peak field supported by the conductors. For an active field of 10 T in a 12 m diameter annual active channel of a thruster with 24 modules, the peak field is 15.6 T on the Nb₃Sn conductors and the structure has to sustain 10(sup 8) N/m forces. The necessity to place some magnetic or superconducting shield is discussed, particularly when the thruster is in a degraded mode.

NTIS

Conductors; Magnetic Fields; Magnetohydrodynamics; Numerical Analysis; Superconductivity; Superconductors (Materials)

19980016814 National Inst. of Standards and Technology, Gaithersburg, MD USA

Solid Propellant Gas Generators: Proceedings of the 1995 Workshop

Yang, J. C., National Inst. of Standards and Technology, USA; Grosshandler, W. L., National Inst. of Standards and Technology, USA; Nov. 1995; 226p; In English

Report No.(s): PB96-131479; NISTIR-5766; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

The intent of the workshop was to bring together gas generator manufacturers, researchers, and potential users to discuss various critical issues related to the evaluation and performance of the gas generators as a fire fighting tool and the search for new propellants. The specific objectives of the workshop, which reflected the need for such an apparatus, were: Identification of certification procedure(s) for gas generators in fire suppression applications; determination of critical parameters for evaluating the fire suppression efficiency of various gas generators; development of a standard methodology to facilitate testing of gas generators; identification of possible applications other than protection of engine nacelles and dry bays; and identification of a new generation of propellants.

NTIS

Solid Propellant Combustion; Gas Generators; Conferences; Evaluation; Performance Tests

CHEMISTRY AND MATERIALS (GENERAL)

19980015252 Minnesota Univ., Dept. of Chemical Engineering, Duluth, MN USA

Predicting Toxicity and Degradability of Quadricyclane, Fluorocarbon Ethers and Their Analogs *Final Report, 1 Aug. 1996 - 31 Jul. 1997*

Basak, Subhash C., Principal Investigator, Minnesota Univ., USA; Lodge, Keith B., Minnesota Univ., USA; Schubauer-Berigan, Joseph, South Carolina Univ., USA; Jun. 1997; 207p; In English

Contract(s)/Grant(s): F49620-94-1-0401; AF Proj. 2312

Report No.(s): AD-A329766; NRRI/TR-97/15; AFOSR-TR-97-0374; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

A number of novel molecular similarity methods have been developed using topos-structural and topochemical parameters which can be computed directly from molecular structure using POLLY. Topological indices (TIs), atom pairs (APs), geometrical parameters, and semiempirical quantum chemical parameters have been used for molecular similarity analysis and development of hierarchical QSAR models. The relative effectiveness of the various similarity techniques in selecting analogs and estimating properties of toxicological importance have been tested on a selected set of properties such as mutagenicity, acute toxicity, lipophilicity (logP, octanol/water), etc. The K nearest neighbor (KNN) method, $K=1,2,\dots,25$, has been used in generating probe-induced subsets from different databases. Results show that the KNN method gives the best estimate of properties at $K=5-10$ for the properties studied.

DTIC

Toxicity; Ethers; Fluorocarbons; Structural Design; Molecular Structure; Data Bases

19980015414 Southwestern Ohio Council for Higher Education, Dayton, OH USA

A Summary of Various Materials Research Experiments *Final Report, 27 May 1992 - 26 May 1997*

Vogler, Wanda G., Southwestern Ohio Council for Higher Education, USA; Feb. 1997; 1347p; In English

Contract(s)/Grant(s): F33615-92-C-5904; AF Proj. 2418

Report No.(s): AD-A330173; WL-TR-97-4037; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

This Technical Report gives a summary of the research performed in the support of the Wright Laboratory Materials Directorate under a Student Support contract. The report contains a summary of the activities undertaken in administering the contract as well as the research and results for each of 284 Tasks completed under the contract. Tasks included technical support and research in such areas as: Nonmetallic materials (structural materials, mechanics and surface interactions, polymers, nonstructural materials), metals and ceramics (processing and high temperature materials, metals behavior, structural metals, nondestructive evaluation), electromagnetic materials (hardened materials, electronic and optical materials), system support materials integrity, materials engineering, computer activities and manufacturing (material processing control paradigms, feature-based material/product design, self-improving systems).

DTIC

Ceramics; Optical Materials; Refractory Materials; Nondestructive Tests

19980016125 Ohio State Univ., Dept. of Physics, Columbus, OH USA

Synthesis and Characterization of Oligomeric Anilines

Feng, J., Ohio State Univ., USA; Zhang, W., Ohio State Univ., USA; MacDiarmid, A. G., Ohio State Univ., USA; Epstein, A. J., Ohio State Univ., USA; Sep. 20, 1997; 7p; In English

Contract(s)/Grant(s): N00014-95-I-0302; N00014-92-J-1369

Report No.(s): AD-A330138; TR-P306; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

The synthesis of well characterized polyaniline oligomers $H-(C_6H_4)-N(H)_n-H$ ($n=4, 8, 16$) (depicted for simplicity in the fully reduced form) from commercial dianiline, ($n=2$) is reported. Rapid oxidative coupling reactions result predominately in the formation of tetramer, octamer and hexadecamer, respectively, when the reagents are mixed in optimum ratios. Doping by HCl after conversion to the emeraldine oxidation state resulted in conductivities in the range from 0.001 to 0.01 S/cm

DTIC

Hydrochloric Acid; Oligomers; Oxidation

Includes physical, chemical, and mechanical properties of laminates and other composite materials. For ceramic materials see 27 Nonmetallic Materials.

19980012523 California Dept. of Transportation, Office of Materials Engineering and Testing Services, Sacramento, CA USA
Evaluation of Deflection and Bending Strength Characteristics of Fiber-Reinforced Plastic Lighting Standards *Final Report*

O'Keeffe, M., California Dept. of Transportation, USA; Nov. 1995; 127p; In English

Report No.(s): PB96-176128; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The results of tests performed on six different models of fiberglass-reinforced plastic (FRP) lighting standards are presented. Four parameters, including deflection of the pole tip under a specified bending load, ultimate bend strength, degradation of coating after 2,500 hours of accelerated weathering, and coating thickness, were evaluated. Results are compared to requirements in the California Department of Transportation 1992 Standard Special Provision 86.08.5 'Fiberglass Lighting Standards' Three different styles of FRP poles, some with breakaway anchor bases, direct burial breakaway joints, and non-breakaway anchor bases, (each style in lengths of 9,140. mm and 10,700 mm), were obtained from two manufacturers of FRP lighting standards.

NTIS

Anchors (Fasteners); Boundary Layer Separation; Flexural Strength; Loads (Forces); Transportation; Weathering

19980013120 Forest Service, Brooks Forest Products Center, Blacksburg, VA USA

Ultrasonic Defect Detection in Wooden Pallet Parts for Quality Sorting

Schmoltdt, D. L., Forest Service, USA; Nelson, R. M., Forest Service, USA; Ross, R. J., Forest Service, USA; Proceedings of the Nondestructive Evaluation of Materials and Composites; Dec. 1996; Volume 2944, pp. 285-295; In English; Nondestructive Evaluation of Materials and Composites, 3-5 Dec. 1996, Scottsdale, AZ, USA; Sponsored by InterNational Society for Optical Engineering, USA

Report No.(s): PB97-154777; ISBN 0-8194-2348-3; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Millions of wooden pallets are discarded annually due to damage or because their low cost makes them readily disposable. Higher quality wooden pallets, however, can be built from high quality deckboards and stringers, and have a much longer life cycle and a lower cost per trip. The long-term goal of this project is to develop an automated pallet part inspection system to sort pallet parts according to grade. Ultrasonic time of flight (TOF) measurement in a pitch-catch arrangement are being used to distinguish different types of defects, including knots, decay, cross grain, and voids, from clear wood. Rolling transducers of 3 different frequencies (84 KHz, 0.5 MHz, and 1.25 MHz) have been used to collect measurements on four oak deckboards of 1/2 inch thickness. Ultrasonic C-scans taken on a 1/2 inch x 1/2 inch grid indicate that TOF with 84 KHz transducers can be used to partially distinguish between several deckboard features and clear wood. Nevertheless, future application of these results to defect detection must be limited to single, pixel value classification, but must include pixel neighborhoods with textural information.

NTIS

Damage Assessment; Life (Durability); Ultrasonic Flaw Detection; Nondestructive Tests; Quality Control; Wooden Structures

19980013647 NERAC, Inc., Tolland, CT USA

Metal Matrix Composites: Fatigue and Fracture Testing. (Latest citations from the Aerospace Database)

Jan. 1996; In English

Report No.(s): PB96-859681; NASA/TM-96-206844; NAS 1.15:206844; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning techniques and results of testing metal matrix composites for fatigue and fracture. Methods include non-destructive testing techniques, and static and cyclic techniques for assessing compression, tensile, bending, and impact characteristics.

NTIS

Bibliographies; Composite Materials; Metal Matrix Composites; Fatigue (Materials)

19980013901 Allison Advanced Development Co., Indianapolis, IN USA

Low Cost Manufacturing Approach of High Temperature PMC Components *Final Report*

Kannmacher, Kevin, Allison Advanced Development Co., USA; Nov. 1997; 82p; In English

Contract(s)/Grant(s): NAS3-27420; RTOP 523-21-13

Report No.(s): NASA/CR-1997-206225; NAS 1.26:206225; E-10962; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The overall objective is to develop a satisfactory sheet molding compound (SMC) of a high temperature polyimide, such as PMR-11-50, VCAP-75, or NB2-76, and to develop compression molding processing parameters for a random, chopped fiber, high temperature, sheet molding compound that will be more affordable than the traditional hand lay-up fabrication methods. Compression molding will reduce manufacturing costs of composites by: (1) minimizing the conventional machining required after fabrication due to the use of full 360 deg matched tooling, (2) reducing fabrication time by minimizing the intensive hand lay-up operations associated with individual ply fabrication techniques, such as ply orientation and ply count and (3) possibly reducing component mold time by advanced B-staging prior to molding. This program is an integral part of Allison's T406/AE engine family's growth plan, which will utilize technologies developed under NASA's Sub-sonic Transport (AST) programs, UHPTET initiatives, and internally through Allison's IR&D projects. Allison is aggressively pursuing this next generation of engines, with both commercial and military applications, by reducing the overall weight of the engine through the incorporation of advanced, lightweight, high temperature materials, such as polymer matrix composites. This infusion of new materials into the engine is also a major factor in reducing engine cost because it permits the use of physically smaller structural components to achieve the same thrust levels as the generation that it replaced. A lighter, more efficient propulsion system translates to a substantial cost and weight savings to an airframe's structure.

Author

Polyimides; Sheet Molding Compounds; Technology Utilization; Modulus of Elasticity; Compressive Strength; Tensile Strength; Polyimide Resins

19980014221 NERAC, Inc., Tolland, CT USA

Developments in Reinforcing Fibers: Carbon and Graphite. (Latest Citations from Engineered Materials Abstracts)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-862818; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning developments in carbon and graphite reinforcing fibers. References discuss market and technology trends, new fibers and their production methods, fiber surface preparation methods, and application to new composite materials. New developments in glass fibers are discussed in a separate bibliography. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Carbon Fibers; Graphite; Reinforcing Fibers; Composite Materials

19980014224 NERAC, Inc., Tolland, CT USA

Automation in Processing Composites: Testing and Quality Control. (Latest Citations from Engineered Materials Abstracts)

Feb. 1996; In English

Report No.(s): PB96-863113; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning automated inspection and quality assurance techniques used in composite materials processing. Citations discuss robotics, fuzzy logic, and intelligent systems used in Quality Control and Nondestructive testing. Technologies and equipment include ultrasonics, x-rays, and smart structures. Automation in molding of composite materials and in forming of composite materials is covered in separate bibliographies. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Composite Materials; Nondestructive Tests; Quality Control; Inspection; Automation

19980014441 Massachusetts Inst. of Tech., Dept. of Chemical Engineering, Cambridge, MA USA

Nanocrystalline Processing and Interface Engineering of Si₃N₄-based Nanocomposites Progress Report, 1 Jul. - 30 Sep. 1997

Ying, Jackie Y., Massachusetts Inst. of Tech., USA; Oct. 01, 1997; 8p; In English

Contract(s)/Grant(s): N00014-95-I-0626

Report No.(s): AD-A330949; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This report describes the microstructural characterization of nanocrystalline titanium nitride (TiN) produced in our forced flow reactor. Microscopy studies of TiN densified through a pressureless sintering process show a consistent ultrafine microstructure with grains of 140 nm and no glassy intergranular or secondary phases. Comparison of TiN ceramics processed by different

methods demonstrates that there is a clear benefit to avoiding exposure of the starting powders to air, but that pressure application during sintering (e.g., by HIPing at 200 MPa) was not necessary to achieve full densification at 1400 deg C. STEM analysis of a fully-dense UN800 TiN ceramic found no oxygen-rich regions in the grains or grain boundaries.

DTIC

Ceramics; Densification; Grain Boundaries; Microscopy; Microstructure; Powder (Particles); Silicon Nitrides; Titanium Nitrides

19980014802 NERAC, Inc., Tolland, CT USA

Silicon Carbide Whisker Composites (Latest Citations from Engineered Materials Abstracts)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863550; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the manufacture and applications of silicon carbide whisker reinforced composites. Citations discuss the preparation of whiskers and the processing of composites containing the whiskers. Applications include aerospace engines, automotive components, engine components, and surgical implants. Physical properties such as bending strength, crack propagation, creep, fracture toughness, and stress strain curves are covered. Ceramic matrix, metal matrix, and carbon-carbon composites are examined. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Silicon Carbides; Whisker Composites

19980014816 Stanford Univ., Dept. of Aeronautics and Astronautics, Stanford, CA USA

Manufacture and Design of Composite Grids Final Report, 1 Jun. 1996 - 31 May 1997

Tsai, Stephen W., Stanford Univ., USA; Jul. 1997; 28p; In English

Contract(s)/Grant(s): F49620-96-I-0258

Report No.(s): AD-A329659; AFOSR-TR-97-0322; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Grid structures have been in use for decades. Many were made of reinforced concrete or metals. Grids made of composite materials offer high stiffness and strength at low mass that are competitive with traditional composite laminates. Commonly available manufacturing processes such as filament winding, pultrusion and tubes made from female molds are used to produce composite grids. Cost effective grids can then be made in large sizes and quantities. Grids derive their global stiffness and strength from their ribs. They are fundamentally different from laminates which derive theirs from plies. The models for stiffness and failure modes can be viewed as simple extensions of laminated plate theory. It is hoped that grids will emerge as one of the common structural forms along with solid, stiffened and sandwich panels. Potential applications of composite grids are also mentioned.

DTIC

Composite Materials; Concretes; Cost Effectiveness; Failure Modes; Females; Filament Winding; High Strength; Manufacturing; Sandwich Structures

19980015125 University of South Florida, Dept. of Mechanical Engineering, Tampa, FL USA

Fracture Mechanics of Brittle Matrix Composites with Imperfect Interfaces Final Report, 1 Jul. 1995 - 31 Aug. 1997

Kaw, Autar K., Compiler, University of South Florida, USA; Krishnan, P., University of South Florida, USA; Madonraj, H., University of South Florida, USA; Ye, J., University of South Florida, USA; Besterfield, G. H., University of South Florida, USA; Oct. 07, 1997; 36p; In English

Contract(s)/Grant(s): F49620-95-I-0164

Report No.(s): AD-A331372; AFOSR-97-0548TR; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In understanding the complexity of the fracture mechanics of brittle matrix composites, knowing reliable values of the mechanical properties of the fiber-matrix interface are important. Since all experiments designed to evaluate the mechanical properties of the fiber-matrix interface rely on curve fitting experimental measurements to analytical results, accurate physical modeling of these tests is imperative. In this final report, two common tests, namely the push-in test and the slice compression test, were analytically simulated. In the push-in test, the effect of extrinsic factors such as indent or shape and size, and push-through radius hole, and intrinsic factors such as transverse isotropy of fibers on load-displacement curves was studied. All factors except the push through hole-radius were found to affect the load-displacement curves. In the slice compression test, comparison was made for the values of maximum protrusion, residual protrusion and debond lengths for a simple shear-lag analysis and a finite element analysis model. Large differences ranging from 15% to 70% were found by using the two different models. Hence, the importance

of accurate modeling of the test cannot be ignored. The study also gives tools to an experimentalist for designing reliable experiments for evaluating reliable values of the mechanical properties of the fiber-matrix interface.

DTIC

Brittleness; Fiber-Matrix Interfaces; Fracture Mechanics; Composite Materials

19980015199 New Mexico Inst. of Mining and Technology, Dept. of Metallurgical and Materials Engineering, Socorro, NM USA
Reactively Sintered Molybdenum Disilicide-Based Composites Final Report, 26 May 1996 - 28 Feb. 1997

Chawla, K. K., New Mexico Inst. of Mining and Technology, USA; Apr. 01, 1997; 88p; In English

Report No.(s): AD-A330977; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The objective of this research was to identify the phases formed and determine some mechanical properties of reactively sintered MoSi₂ and MoSi₂ composites with carbon additions. The carbon additions were made via polymeric coatings on MoSi₂ particles. Carbon was added to form silicon carbide particles (SiCp) in situ and to reduce the inherent presence of SiO₂ in MoSi₂. The in situ formation of SiCp would increase the low temperature toughness of MoSi₂ by using it as a reinforcement and also reduce the high temperature creep by reducing grain boundary sliding caused by viscous flow of SiO₂. The carbon coating of the MoSi₂ powder was obtained by: phenolic resin based carbon by solvent evaporation and aqueous dispersion flocculation. The sintering temperatures and times ranged from 1600 to 1800 deg C and 1 to 100 hr., respectively. The addition of carbon did reduce the presence of SiO₂ and there was formation of SiCp. However, the SiCp formation was less than expected and, therefore, did not increase toughness significantly. The Nowotny phase (Mo_{4.8}Si₃C_{0.6}) was also found in less than expected amounts.

DTIC

Carbon; Coating; Creep Properties; Disilicides; Evaporation; Grain Boundaries; High Temperature; Low Temperature; Mechanical Properties; Molybdenum; Molybdenum Compounds; Phenolic Resins; Plastic Coatings; Polymeric Films; Powder (Particles)

19980015543 NERAC, Inc., Tolland, CT USA

Interfacial Bond Strength of Composite Materials. (Latest Citations from Engineered Materials Abstracts)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864392; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the interfacial bond strength of composite materials. Fibers include cellulosic, aramid, e-glass, carbon, and silicon carbide. Matrices include thermosets and thermoplastics. Short fibers, long fibers, knitted fibers and wound fibers are discussed. Failure modes such as spall fracture and fiber pull-out are included.

NTIS

Bibliographies; Composite Materials; Strength; Fiber Strength

19980015635 NERAC, Inc., Tolland, CT USA

Flammability and Toxicity of Composites. (Latest Citations from Engineered Materials Abstracts)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864194; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning flammability and toxicity of composite materials, including phenolics, polyesters, polyimides, and polyesterimides. Panels, foams, sandwiches, and laminates are reviewed. The citations also review uses in space, marine, construction, and automotive applications. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Flammability; Toxicity; Composite Materials

19980015924 NERAC, Inc., Tolland, CT USA

Fiber Reinforced Composites. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Jan. 1996; In English

Report No.(s): PB96-859541; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning methods of producing and applying high-strength, thermally-stable, and fracture-tough fiber reinforced composites (FRC). Methods of forming FRC products and their uses in bearing,

seal, brake, shaft, coil spring, and tool support materials are presented. Preparation and treatment techniques for fibrous materials used in FRC production are disclosed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Fiber Composites

19980016130 NERAC, Inc., Tolland, CT USA

Fabric Reinforced Composites. (Latest Citations from World Textile Abstracts)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863840; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning natural and synthetic fibers used as reinforcing agents for composite materials. While plastics and elastomers are emphasized, other reinforced materials are also examined. Webs, mats, and yarns of glass, carbon, polyester, aramid, metal, polyamide, and polypropylene are considered as reinforcing materials for epoxies, rubbers, vinyls, cements, and polyesters. Structural, mechanical, and physical properties of composite materials are discussed, along with their manufacturing processes and applications. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Fiber Composites; Fabrics; Reinforcing Materials; Synthetic Fibers

19980016867 California Univ., Div. of Structural Engineering, La Jolla, CA USA

Experimental Spin Testing of Integrally Damped Composite Plates Final Report

Kosmatka, John, California Univ., USA; Feb. 1998; 34p; In English

Contract(s)/Grant(s): NCC3-493

Report No.(s): NASA/CR-1998-207058; SSRP-98/01; NAS 1.26:207058; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The experimental behavior of spinning laminated composite pretwisted plates (turbo-fan blade-like) with small (less than 10% by volume) integral viscoelastic damping patches was investigated at NASA-Lewis Research Center. Ten different plate sets were experimentally spin tested and the resulting data was analyzed. The first-four plate sets investigated tailoring patch locations and definitions to damp specific modes on spinning flat graphite/epoxy plates as a function of rotational speed. The remaining six plate sets investigated damping patch size and location on specific modes of pretwisted (30 degrees) graphite/epoxy plates. The results reveal that: (1) significant amount of damping can be added using a small amount of damping material, (2) the damped plates experienced no failures up to the tested 28,000 g's and 750,000 cycles, (3) centrifugal loads caused an increase in bending frequencies and corresponding reductions in bending damping levels that are proportional to the bending stiffness increase, and (4) the centrifugal loads caused a decrease in torsion natural frequency and increase in damping levels of pretwisted composite plates.

Author

Fan Blades; Flat Plates; Graphite-Epoxy Composites; Spin Tests; Viscoelastic Damping; Vibration Damping; Laminates

19980016898 Tennessee Univ., Dept. of Mechanical and Aerospace Engineering, Knoxville, TN USA

On the Interaction Between Damage and Moisture Sorption in Cross-Ply Laminated Composites, 1 Feb. 1996 - 30 Sep. 1998

Abdel-Tawab, Khaled, Tennessee Univ., USA; Weitsman, Y., Tennessee Univ., USA; Mar. 1997; 11p; In English

Contract(s)/Grant(s): N00014-96-I-0821

Report No.(s): AD-A333379; MAES97-1.0-CM; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Laminated composites are increasingly used in engineering applications that involve exposures to ambient humidities. Therefore, for a reliable and economic design of structures made of laminated composites, it is necessary to study moisture sorption in these materials and the consequent effects on mechanical behavior. Under service conditions, laminated composites may also undergo damage in the form of microcracks, which can affect the sorption process and hence the moisture weight-gain measurements. The objective of this article is to provide some guidelines for both experimental and analytical investigations of moisture content in transversely cracked cross-ply laminated composites.

DTIC

Composite Materials; Damage; Moisture

25
INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry. For related information see also 77 Thermodynamics and Statistical Physics.

19980012513 Central Lab. of the Research Councils, Daresbury Lab., Warrington, UK

Towards Direct Simulation of Turbulent Combustion on the Cray T3D: Initial Thoughts and Impressions

Emerson, D. R., Central Lab. of the Research Councils, UK; Cant, R. S., Cambridge Univ., UK; Apr. 1996; ISSN 1362-0207; 27p; In English

Report No.(s): PB96-169024; DL-TR-96-002; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The paper provides an initial assessment of a Cray T3D MPP system for an engineering application. A comparison of the performance of a Direct Numerical Simulation code on the Cray T3D and the Intel iPSC/860 is presented. The floating point performance of standard FORTRAN 77 indicates that there is room for improvement and details concerning necessary optimizations to improve the floating point performance of a conjugate gradient solver are given. The lack of a secondary cache clearly affects the cache efficiency when preconditioning is applied. In comparison to the Intel iPSC/860, the CRAY T3D shows a substantial improvement in performance and also offers a low-latency, high-bandwidth communications network.

NTIS

Communication Networks; Computerized Simulation; Conjugate Gradient Method; Direct Numerical Simulation; Floating Point Arithmetic; Turbulent Combustion

19980012546 NERAC, Inc., Tolland, CT USA

Water Treatment by Reverse Osmosis. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Jan. 1996; In English

Report No.(s): PB96-859889; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning water purification systems and components using reverse osmosis technology. Patents include purification systems and devices for seawater, waste water, and drinking water. Topics also include complete purification systems, valves and distribution components, membranes, supports, storage units, and monitors. Water purification systems using activated charcoal are referenced in a related bibliography. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Water Treatment; Bibliographies; Reverse Osmosis

19980012765 Army Cold Regions Research and Engineering Lab., Hanover, NH USA

Antifreeze Admixtures for Concrete

Korhonen, Charles J., Army Cold Regions Research and Engineering Lab., USA; Cortez, Edel R., Army Cold Regions Research and Engineering Lab., USA; Durning, Timothy A., Army Cold Regions Research and Engineering Lab., USA; Jeknavorian, Ara A., Army Cold Regions Research and Engineering Lab., USA; Oct. 1997; 53p; In English

Report No.(s): AD-A332653; CRREL-SR-97-26; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The goal of this project was to develop a chemical admixture that would reduce the need for wintertime thermal protection of freshly placed concrete. Chemicals were investigated for their ability to promote strength gain in concrete cured below 0 deg C. The project was carried out in five phases. Phase 1 evaluated existing and new admixtures. Phase 2 measured the effect of promising chemicals on concrete properties. Phases 3 and 4 tested the practicality of using the new technology/admixture in the field. Phase 5 disseminated the findings through an Army conference and through the development of this report, in addition to normal W.R. Grace advertising channels. Laboratory strength tests established that two prototype admixtures were capable of protecting concrete down to -5 deg C. Results from other laboratory tests show that the chemicals pose no harm to the concrete or embedded ferrous metals. Concrete containing the prototype admixtures passes standard freeze-thaw tests, does not shrink unusually, does not contain harmful alkalis, and does not produce irregular hydration products. Field tests clearly demonstrated that working with these new admixtures requires no new skills. The concrete can be mixed at lower temperatures, saving energy. The admixtures are easily dosed into the mixing trucks, as is normal practice today, and concrete is finished in the usual manner. Estimates show that the two prototype admixtures can extend the construction season by as much as three months in the contiguous USA. The

prototype has proved that low-temperature admixtures are possible. The industry partner sees the need to develop admixtures that will work to -10 deg C before going commercial with this technology.

DTIC

Admixtures; Antifreezes; Chemical Effects; Concretes; Construction; Ferrous Metals; Prototypes

19980012766 Physical-Technical Inst., Tashkent, Uzbekistan

Continuous Solid Solutions with new Chemical Compounds Final Report

Saidov, Mukhtar, Physical-Technical Inst., Uzbekistan; Sep. 02, 1997; 13p; In English

Contract(s)/Grant(s): F61708-97-W-0078

Report No.(s): AD-A332654; EOARD-SPC-97-4018; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report results from a contract tasking Physical. Technical Institute as follows: The contractor will investigate the conditions of formation and preferential fields of applications for continuous solid solutions with new chemical compounds.

DTIC

Chemical Composition; Gas Composition

19980013048 Virginia Polytechnic Inst. and State Univ., Dept. of Mechanical Engineering, Blacksburg, VA USA

Transport of High Concentrations of Carbon Monoxide to Locations Remote from the Burning Compartment Annual Report, 1 Sep. 1995 - 31 Aug. 1996

Lattimer, B. Y., Virginia Polytechnic Inst. and State Univ., USA; Vandsburger, U., Virginia Polytechnic Inst. and State Univ., USA;

Roby, R. J., Hughes Associates, Inc., USA; Apr. 1997; 358p; In English

Contract(s)/Grant(s): NIST-60NANB4D1651

Report No.(s): PB97-167563; NIST-GCR-97-713; No Copyright; Avail: CASI; A16, Hardcopy; A03, Microfiche

An experimental study was conducted to measure the effects of oxygen entrainment on the transport of CO in building fires, and to develop a procedure for estimating CO levels during a building fire. Experiments were performed with an insulated 1/4-scale room connected to the side of a 1/4-scale hallway forming an L-shape. Measurements of CO, unburned hydrocarbons (UHC), CO₂, and O₂ concentrations and temperature were performed within the compartment, the hallway and post-hallway in the exhaust duct. With a fixed size opening connecting the compartment to the hallway, the oxygen entrainment was varied by changing the depth of the oxygen deficient hallway upper layer. The CO level was a function of the compartment stoichiometry and the occurrence of external burning. A procedure for predicting CO levels in building fires was also developed. The procedure accounts for the effects of external burning, the non-uniform transport of toxic gases in the hallway, the hallway upper-layer depth and the stoichiometry of the system on the CO levels at remote locations.

NTIS

Carbon Monoxide; Entrainment; Gas Transport; Combustion Chemistry; Concentration (Composition); Air Sampling; Fires; Combustion Products

19980013404 NYMA, Inc., Brook Park, OH USA

Using Laser-Induced Incandescence to Measure Soot/Smoke Concentrations Final Report

VanderWal, Randall L., NYMA, Inc., USA; Dec. 1997; 12p; In English; Original contains color illustrations

Contract(s)/Grant(s): NAS3-27186; RTOP 963-70-0E

Report No.(s): NASA/CR-1997-206325; NAS 1.26:206325; E-11003; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Laser-induced incandescence offers great advantages in measuring soot concentrations. A brief summary of the technique and some illustrations of its capabilities is presented here.

Author

Incandescence; Soot; Smoke; Laser Applications

19980013656 Secretariat d'Etat a la Recherche, Lab. de Synthese Organique, Algiers, Algeria

Recovery of the heavy elements by NaY AND NaZSM-5 sorbant materials

Nibou, Djamel, Secretariat d'Etat a la Recherche, Algeria; Lebaili, Soltane, Universite des Sciences et de la Technologie Houari Boumediene, Algeria; Apr. 1997; 10p; In English

Report No.(s): INIS-DZ-0005; DE97-632320; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

Porous sorbants as zeolites have a several applications in differents fiels: industrial gas purification, catalysis, transformation hydrocarbures prosesses and exchange ions. The high capacity to exchange their cations with those of aqueous solutions was

known. Since the accession of synthetic zeolites, these silicates have invaded the market and the first industrial applications were in exchange field. Studies at Battelle Northwest in Richland, Washington have shown that zeolites may be used in treatment of radioactive wastes. The used method for storing the isotopes is based on selective removal by ion exchange. Clinoptilolite, zeolite (modernite), NaA, and AW-500 have been used. In this context, the present work deals with the recovery of heavy metals like lead and uranium using some microporous materials. The obtained results show that NaY faujasite and NaZSM-5 of the FAU- and MFI-type structure respectively are very effective in removing these elements from waste water.

DOE

Heavy Elements; Lead (Metal); Sorbents; Uranium; Sodium Alloys; Yttrium Compounds; Materials Recovery

19980013900 NASA Lewis Research Center, Cleveland, OH USA

Electrodeposited CuInSe₂ Thin Film Junctions

Raffaella, R. P., Florida Inst. of Tech., USA; Mantovani, J. G., Florida Inst. of Tech., USA; Bailey, S. G., NASA Lewis Research Center, USA; Hepp, A. F., NASA Lewis Research Center, USA; Gordon, E. M., Wilberforce Univ., USA; Haraway, R., Wilberforce Univ., USA; Nov. 1997; 10p; In English, 1-5 Dec. 1997, Boston, MA, USA; Sponsored by Materials Research Society, USA Contract(s)/Grant(s): NCC3-535; RTOP 632-1A-1A

Report No.(s): NASA/TM-1997-206322; NAS 1.15:206322; E-11014; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

We have investigated thin films and junctions based on copper indium diselenide (CIS) which have been grown by electrochemical deposition. CIS is a leading candidate for use in polycrystalline thin film photovoltaic solar cells. Electrodeposition is a cost-effective method for producing thin-film CIS. We have produced both p and n type CIS thin films from the same aqueous solution by simply varying the deposition potential. A CIS pn junction was deposited using a step-function potential. Stoichiometry of the single layer films was determined by energy dispersive spectroscopy. Carrier densities of these films increased with deviation from stoichiometry, as determined by the capacitance versus voltage dependence of Schottky contacts. Optical bandgaps for the single layer films as determined by transmission spectroscopy were also found to increase with deviation from stoichiometry. Rectifying current versus voltage characteristics were demonstrated for the Schottky barriers and for the pn junction.

Author

Copper Indium Selenides; Thin Films; Electrodeposition

19980013928 California Univ., Materials Dept., Santa Barbara, CA USA

Aqueous Processing of Si₃N₄ Powder with Chem-Adsorbed Silanes, Period ending 30 Sep. 1996

Colic, Miroslav, California Univ., USA; Franks, George V., California Univ., USA; Fisher, Matthew, California Univ., USA; Lange, Fred F., California Univ., USA; Sep. 30, 1996; 33p; In English

Contract(s)/Grant(s): N00014-96-1-0975

Report No.(s): AD-A332911; TR-5; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Different chem-adsorbed silane molecules have been used to produce weakly attractive silicon nitride particle networks for aqueous colloidal processing. Silanes with diamino and polyethyleneglycol hydrophilic heads yielded slurries with the lowest viscosity, longest sedimentation stability and highest packing density. Chem-adsorbed silane molecules protected silicon nitride and yttrium oxide, a common processing aid, from hydrolysis at pH's between 5.5 and 11. A novel approach was used to produce short range repulsive potentials necessary to yield the weakly attractive networks. Addition of salt to dispersed silicon nitride slurries with particles coated with polyethyleneglycol-silane, caused the collapse of the 22 atoms long chains and residual electrical double layer. This produced a weakly attractive network which persisted during consolidation to yield a plastic body with a flow stress that was dependent on the counterion size. When 0.5 M tetramethylammonium chloride was used at pH 10, plastic bodies had a flow stress similar to clay, whereas lithium counterions produced bodies with a much higher flow stress.

DTIC

Silicon Nitrides; Silanes; Powder (Particles); Adsorption

19980014110 Georgia Univ., Dept. of Chemistry, Athens, GA USA

Surface Chemistry in Electrochemical Atomic Layer Processing Final Report, Apr. 1991 - Apr. 1996

Stickney, John L., Georgia Univ., USA; Oct. 16, 1997; 4p; In English

Contract(s)/Grant(s): N00014-91-J-1919

Report No.(s): AD-A331050; TR-30; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Atomic layer processing involves the formation and/or etching of materials an atomic layer at a time. Atomic layer epitaxy is the most obvious example, where a thin film of a material is formed an atomic layer at a time. That is, surface limited reactions are used to deposit individual atomic layers of the elements making up a compound. These reactions are used in a cycle, where

each cycle results in the formation of a monolayer of the compound. The present studies were designed to investigate these surface limited reactions. To determine what the structures of the deposits were, and how that structure influenced subsequent deposition.

DTIC

Thin Films; Surface Reactions; Atomic Layer Epitaxy

19980014211 Georgia Univ., Dept. of Chemistry, Athens, GA USA

Thin Layer Electrochemical Studies of ZnS, ZnSe, and ZnTe Formation by Electrochemical Atomic Layer Epitaxy (ECALE), May 1996 - Sep. 1997

Colletti, Lisa P., Georgia Univ., USA; Thomas, Sajan, Georgia Univ., USA; Wilmer, Elvin, Georgia Univ., USA; Stickney, John L., Georgia Univ., USA; Oct. 16, 1997; 12p; In English

Contract(s)/Grant(s): N00014-19-J-1919

Report No.(s): AD-A331052; TR-28; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Thin-layer electrochemical studies of the underpotential deposition (UPD) of Zn, Te, Se, and S on polycrystalline Au substrates have been performed. These studies were initiated to investigate the electrodeposition of ZnTe, ZnSe, and ZnS by electrochemical ALE (ECALE). Zn UPD on Au begins at -0.5 V and results in a coverage of 0.47 monolayer (ML). Te and Se atomic layers were formed using a two step process where bulb chalcogenide was removed by reduction, leaving the atomic layer. The reduction of the last atomic layer of Te or Se was not observed, regardless of how negative the potential was scanned. Sulfur atomic layers were spontaneously deposited below -0.6 V from a sulfide solution. Thermodynamic effects are clearly evident during the first monolayer of deposition. Zinc deposition onto Te, Se, and S coated electrodes occurs at progressively more positive potentials as the stability of the zinc compounds increase. This initial information was used to develop ECALE cycles for the compounds, and thin-films were formed by repeated application of the cycles. The dependence of the deposit coverage on the deposition potentials was examined and found to display the characteristic 'S' curve of a surface limited process. In addition, the dependence of the coverage on the number of ECALE cycles performed was found to be near the ideal 0.5 ML per cycle for ZnSe and ZnS. The ZnTe coverage per cycle was less than expected indicating that further optimization of deposition conditions is needed.

DTIC

Atomic Layer Epitaxy; Atoms; Chalcogenides; Coatings; Cycles; Electrodeposition; Electrodes; Polycrystals; S Curves

19980014805 NERAC, Inc., Tolland, CT USA

Magic Angle Spinning NMR Spectroscopy. (Latest citations from the INSPEC Database)

Apr. 1996; In English; Page count unavailable.

Report No.(s): PB96-868286; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the principles and applications of magic angle spinning (MAS) nuclear magnetic resonance (NMR) in high resolution spectra analysis of solids. Magic angle spinning NMR is a very powerful spectrographic technique for the study of structures, dynamics, and reactivity of solids. Industrial materials investigated include zeolites, organic compounds and polymers, liquid crystals, silicate and borate glasses, and alumina and oxide films. Applications in conductive polymers, biological systems, and organic matrixes of composite materials are presented. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Nuclear Magnetic Resonance; Spectroscopy

19980014806 NERAC, Inc., Tolland, CT USA

High Performance Liquid Chromatography. (Latest citations from the Energy Science and Technology Database)

Apr. 1996; In English; Page count unavailable.

Report No.(s): PB96-867650; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development and applications of high performance liquid chromatography technology. Citations discuss chromatographic separation, characterization, analysis, and purification of a variety of substances. References to applications in isotope separation, radiobiology, immunoassay, water pollution, fossil fuel analysis, coal liquefaction, and petroleum fraction are included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Liquid Chromatography

19980014817 Cincinnati Univ., Dept. of Materials Science and Engineering, OH USA

Combustion Synthesis of Niobium Intermetallics and Composites Final Report, 1 Apr. 1995 - 30 Mar. 1996

Sekhar, J. A., Cincinnati Univ., USA; Dey, G. K., Cincinnati Univ., USA; Carr, D., Cincinnati Univ., USA; Gupta, V., Cincinnati Univ., USA; Apr. 01, 1997; 131p; In English

Contract(s)/Grant(s): F49620-93-I-0200

Report No.(s): AD-A329703; ICM-037; AFOSR-TR-97-0436; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This report describes studies carried out on the various aspects of microprecipitation synthesis on Ni and Nb aluminides. The effect of process parameters like compaction pressure, diluents, preheat temperature, and particle size on the process and on the synthesized product have been examined theoretically as well as experimentally. Models have been developed to explain the effect of the aforementioned process variables on the synthesis process by postulating on the mechanism of the process. A good agreement had been found between model predictions and the observed experimental results. Microprecipitation synthesis is a process in which alloying occurs at a local level at a very rapid rate. In a process of this nature, the homogeneity of the resulting microstructure in terms of phase content and composition is important. Despite the fact that homogeneity of the microstructure is important in products made by this process, no many studies have been carried out to examine this aspect. In this report, the synthesized microstructure has been examined by detailed electron microscopy. One of the highlights of the study is the result of that the compositional and microstructural homogeneity of the microprecipitation synthesized product is unusually uniform, thus establishing the process as potentially useful for aircraft alloys. The fabrication of NiAl with better mechanical properties by the process of microprecipitation synthesis has been attempted. A large number of alloying additions have been made in order to develop a tough alloy. NiAl when alloyed with Fe, Cr and V has been found to show considerable improvement in fracture toughness. Improvement in fracture toughness has been found in the case of NiAl alloyed with Ti and Nb. The effect of a second combustion reaction on the synthesis process and the microstructure has been examined in the case of NiAl alloyed with Ti and B.

DTIC

Combustion Synthesis; Electron Microscopy; Fracture Strength; Homogeneity; Intermetallics; Mechanical Properties; Microstructure

19980015138 Technische Univ., Delft, Netherlands

Ruthenium-Catalyzed Epoxidation of Unfunctionalized Olefins: Scope and Limitations Epoxidatie van Niet-Gefunctionaliseerde Olefinen, Gekatalyseerd door Ruthenium: Mogelijkheden en Beperkingen

Barf, G. A., Technische Univ., Netherlands; Jan. 22, 1996; 172p; In English

Report No.(s): PB97-157382; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

Contents include the following: Introduction: Synthesis of achiral ligands and their use in ruthenium-catalyzed epoxidations with sodium periodate; Synthesis of chiral ligands and their use in ruthenium-catalyzed epoxidations with sodium periodate; Ruthenium-catalyzed epoxidation with various oxidants; Mechanistic aspects of ruthenium-catalyzed epoxidations; Artificial enzymes: polypeptides in ruthenium-catalyzed epoxidations; Evaluation of ruthenium-catalyzed epoxidations.

NTIS

Oxidizers; Polypeptides; Ruthenium; Sodium; Symmetry

19980015141 Gordon Research Conferences, Inc., Kingston, RI USA

Gordon Research Conference on Molten Salts and Liquid Metals Final Report, 1 May - 31 Oct. 1997

Hussey, Charles L., Mississippi Univ., USA; Oct. 1997; 12p; In English; Gordon Research Conference on Molten Salts and Liquid Metals, 3-8 Aug. 1997, Henniker, NH, USA

Contract(s)/Grant(s): F49620-97-I-0044; AF Proj. 2303

Report No.(s): AD-A330639; AFOSR-TR-97-0515; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The purpose of this conference was to provide a forum for the dissemination and discussion of cutting edge research in the fields of molten salt chemistry and liquid metal physics. The scheduled conference program included 23 invited speakers; these speakers were split 13-10 between molten salts and liquid metals, respectively. Although there was no overall conference theme, the research topics that were explored during the conference were loosely organized according to the following subtitles: the structure of liquid metals, spectroscopy in molten salts, low temperature molten salt systems, metal-insulator transitions, technological applications of molten salts, novel synthetic chemistry in molten salts, and expanded liquids. Two poster sessions were held in conjunction with the lectures; approximately 50 of the attendees participated in these poster sessions, and many of the invited speakers also presented posters. = The conference was truly interNational in flavor and included participants from Belgium, Canada, France, Germany, Hungary, Ireland, Japan, Norway, Russia, Sweden, Switzerland, the UK, Ukraine, and the U.S.A. of the

78 registered attendees, 7 were graduate students, 10 were postdoctoral students, 16 were research scientists, 40 were university faculty members, and 5 were research directors or program managers.

DTIC

Insulators; Liquid Metals; Low Temperature; Molten Salts

19980015157 Chicago Univ., Dept. of Chemistry, Chicago, IL USA

Charge and Field induced Spectroscopy of Solid Hydrogen Final Report, 1 Jul. 1994 - 30 Jun. 1997

Oka, Takeshi, Chicago Univ., USA; Oct. 17, 1997; 10p; In English

Contract(s)/Grant(s): F49620-94-I-0386; AF Proj. 3484

Report No.(s): AD-A331301; AFOSR-97-0572TR; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

With the termination of my Air Force project, this is the last report for my effort on solid hydrogen spectroscopy. It has been an extremely inspiring period of ten years working with a group of brilliant students. We have practically created a new field, and the results my students obtained will remain as the cornerstone of future development. I am extremely grateful to AFOSR and taxpayer s for supporting our effort. The field is now just about to find its application to matrix spectroscopy, cryogenic chemical kinetics, solid charge diagnosis, and non-linear optics, etc., and it is heartbreaking on my part to have to terminate our research, but luckily several groups have picked up the momentum. I shall watch the future development with great aspiration.

DTIC

Cryogenics; Diagnosis; Hydrogen; Reaction Kinetics; Solid Cryogenics; Spectroscopy

19980015160 Kentucky Univ., Dept. of Mechanical Engineering, Lexington, KY USA

Flame Base Structure of Small-Scale Pool Fires Final Report

Venkatesh, S., Kentucky Univ., USA; Ito, A., Kentucky Univ., USA; Saito, K., Kentucky Univ., USA; Wichman, I. S., Michigan State Univ., USA; Dec. 1996; 24p; In English

Report No.(s): PB97-137574; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

To improve the understanding of the flame anchoring mechanism and structure of buoyancy-controlled liquid pool fires, the authors employed small scale pool fires whose diameters range between 1.5 - 20 cm. The measurements include flow visualization by a Particle-Track Laser-Sheet technique (PTLS) combined with a high speed video camera and temperature profiles by a fine thermocouple. The authors found from those measurements that major air entrainment occurred through the Primary Anchoring Zone, PAZ, which consists of a small area covering approximately 1 cm high and around the circumference just above the dark zone; while air entrainment through the quenching zone (a dark zone formed between the visible flame edge and the burner port) was negligible. In addition, the authors visualized the existence of a vortex ring at a stagnation zone in the fuel vapor phase for both propanol and hexane pool fires, in agreement with qualitative observation by other workers.

NTIS

Flame Propagation; Diffusion Flames; Experimentation

19980015247 NERAC, Inc., Tolland, CT USA

X-ray Fluorescence Analysis. (Latest Citations from the NTIS Bibliographic Database)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863824; Copyright Waived; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning techniques, methodology, apparatus, design aspects, and applications of x-ray fluorescence analysis. Applications include industrial waste, air pollution, petroleum and geochemistry.

NTIS

Bibliographies; X Ray Fluorescence; X Ray Analysis; Chemical Analysis; Technologies; Design Analysis

19980015255 Georgia Inst. of Tech., Georgia Tech Research Inst., Atlanta, GA USA

Kinetics and Thermochemistry of the Cl(sup 2)P(sub J)) + C2Cl4 Association Reaction

Nicovich, J. M., Georgia Inst. of Tech., USA; Wang, S., Georgia Inst. of Tech., USA; Mckee, M. L., Auburn Univ., USA; Wine, P. H., Georgia Tech Research Inst., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0022-3654, pp. 13-21; Repr. from J. Phys. Chem., v100, 1996 p 680-688; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

A laser flash photolysis-resonance fluorescence technique has been employed to study the kinetics of the Cl(sup 2)P(sub j) + C2Cl4 association reaction as a function of temperature (231-390 K) and pressure (3-700 Torr) in nitrogen buffer gas. The reaction is found to be in the falloff regime between third and second order over the range of conditions investigated, although the

second-order limit is approached at the highest pressures and lowest temperatures. At temperatures below 300 K, the association reaction is found to be irreversible on the experimental time scale of approximately 20 m-s. The kinetic data at T is less than 300 K have been employed to obtain falloff parameters in a convenient format for atmospheric modeling. At temperatures above 330 K, reversible addition is observed, thus allowing equilibrium constants for C₂Cl₅ formation and dissociation to be determined. Second- and third-law analyses of the equilibrium data lead to the following thermochemical parameters for the association reaction: $\Delta H(298) = -18.1 \pm 1.3$ kcal/mol, $\Delta H(0) = -17.6 \pm 1.3$ kcal/mol, and $\Delta S(298) = -27.7 \pm 3.0$ cal/mol.K. In conjunction with the well-known heats of formation of Cl((sup 2)P(sub j)) and C₂Cl₄ the above ΔH values lead to the following heats of formation for C₂Cl₅, at 298 and 0 K: $\Delta H(f,298) = 8.0 \pm 1.3$ kcal/mol and $\Delta H(f,0) = 8.1 \pm 1.5$ kcal/mol. The kinetic and thermochemical parameters reported above are compared with other reported values, and the significance of reported association rate coefficients for understanding tropospheric chlorine chemistry is discussed.

Author

Association Reactions; Atmospheric Chemistry; Chlorine Compounds; Thermochemistry; Photodissociation; Reaction Kinetics; Photolysis; Environment Effects

19980015256 Georgia Inst. of Tech., School of Earth and Atmospheric Sciences, Atlanta, GA USA

Kinetics of the Reaction of O((sup 3)P) with CF₃NO

Thorn, R. P., Georgia Inst. of Tech., USA; Nicovich, J. M., Georgia Inst. of Tech., USA; Cronkhite, J. M., Georgia Inst. of Tech., USA; Wine, P. H., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0538-8066, pp. 22-30; Repr. from InterNational Journal of Chemical Kinetics, v27, 1995 p 369-377; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

A laser flash photolysis-resonance fluorescence technique has been employed to study the kinetics of the reaction of O((sup 3)P) with CF₃NO (k(2)) as a function of temperature. Our results are described by the Arrhenius expression $k(2)(T) = (4.54 \pm 0.70) \times 10^{(exp -12)exp[(-560 \pm 46)/T]}$ cu cm/molecule.s (243 K is less than or equal to T is less than or equal to 424 K); errors are 2 sigma and represent precision only. The O((sup 3)P) + CF₃NO reaction is sufficiently rapid that CF₃NO cannot be employed as a selective quencher for O₂(alpha(1) Delta-g) in laboratory systems where O((sup 3)P) and O₂(alpha 1 Delta g) coexist, and where O((sup 3)P) kinetics are being investigated.

Author

Photolysis; Atmospheric Chemistry; Reaction Kinetics; Temperature Effects; Oxygen; Molecular Excitation; Environment Effects; Carbon Compounds; Fluorine Compounds; Trace Contaminants

19980015257 Georgia Inst. of Tech., School of Earth and Atmospheric Sciences, Atlanta, GA USA

Laser Flash Photolysis Studies of Radical-Radical Reaction Kinetics: The O((sup 3)P(sub J)) + BrO Reaction

Thorn, R. P., Georgia Inst. of Tech., USA; Cronkhite, J. M., Georgia Inst. of Tech., USA; Nicovich, J. M., Georgia Inst. of Tech., USA; Wine, P. H., Georgia Tech Research Inst., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0021-9606, pp. 31-42; Repr. from J. Chem Phys., v102, no. 10, 8 Mar. 1995 p 4131-4142; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

A novel dual laser flash photolysis-long path absorption-resonance fluorescence technique has been employed to study the kinetics of the important stratospheric reaction O((sup 3)P(sub j)) + Br yields(k₁) BrO((sup 2)P(sub J)) + O₂ as a function of temperature (231-328 K) and pressure (25-150 Torr) in N₂ buffer gas. The experimental approach preserves the principal advantages of the flash photolysis method, i.e., complete absence of surface reactions and a wide range of accessible pressures, but also employs techniques which are characteristic of the discharge flow method, namely chemical titration as a means for deducing the absolute concentration of a radical reactant and use of multiple detection axes. We find that k₁ is independent of pressure, and that the temperature dependence of k₁ is adequately described by the Arrhenius expression $k_1(T) = 1.91 \times 10^{(exp -11)(230/J)}$ cu cm/ molecule.s; the absolute accuracy of measured values for k₁ is estimated to vary from ± 20 percent at T approximately 230 K to ± 30 percent at T approximately 330 K. Our results demonstrate that the O((sup 3)P(sub j)) + BrO rate coefficient is significantly faster than previously 'guesstimated,' and suggest that the catalytic cycle with the O((sup 3)P(sub j)) + BrO reaction as its rate-limiting step is the dominant stratospheric BrO(x), odd-oxygen destruction cycle at altitudes above 24 km.

Author

Photolysis; Reaction Kinetics; Radicals; Oxygen; Stratosphere; Atmospheric Chemistry; Bromine Compounds; Trace Contaminants

19980015258 Georgia Tech Research Inst., School of Chemistry and Biochemistry, Atlanta, GA USA

Temperature-Dependent Kinetics Studies of the Reactions $\text{Br}((\text{sup } 2)\text{P}(\text{sub } 3/2)) + \text{CH}_3\text{SCH}_3$ reversible reaction $\text{CH}_3\text{SCH}_2 + \text{HBr}$. Heat of Formation of the CH_3SCH_2 Radical

Jefferson, A., Georgia Tech Research Inst., USA; Nicovich, J. M., Georgia Tech Research Inst., USA; Wine, P. H., Georgia Tech Research Inst., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0023-3654, pp. 64-71; Repr. from The Journal of Physical Chemistry, v98, 1994 p 64-71; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Time-resolved resonance fluorescence detection of $\text{Br}((\text{sup } 2)\text{P}(\text{sub } 3/2))$ atom disappearance or appearance 266 nm laser flash photolysis of $\text{CF}_2\text{Br}_2/\text{CH}_3\text{SCH}_3/\text{H}_2/\text{N}_2$ and $\text{Cl}_2\text{CO}/\text{CH}_2\text{SCH}_3/\text{HBr}/\text{H}_2/\text{N}_2$ mixtures has been employed to study the kinetics of the reactions $\text{Br}((\text{sup } 2)\text{P}(\text{sub } 3/2)) + \text{CH}_3\text{SCH}_3$ reversible reaction $\text{HBr} + \text{CH}_3\text{SCH}_2$ (1,-1) as a function of temperature over the range 386-604 K. Arrhenius expressions in units of $\text{cm}^3/\text{molecule}$ which describe the results are $k_3 = (9.0 \pm 2.9) \times 10^{-11} \exp(-2386 \pm 151/T)$; errors are 2 sigma and represent precision only. To our knowledge, these are the first kinetic data reported for each of the two reactions studied. Second and third law analyses of the equilibrium data for reactions 1 and -1 have been employed to obtain the following enthalpies of reaction in units of kcal/mol: $\Delta H(298) = 6.11 \pm 1.37$ and $\Delta H(0) = 5.37 \pm 1.38$. Combining the above enthalpies of reaction with the well-known heats of formation of Br, HBr, CH_3SCH_3 gives the following heats of formation of the CH_3SCH_2 radical in units of kcal/mol: $\Delta H(f, 298) = 32.7 \pm 1.4$ and $\Delta H(f, 0) = 35.3 \pm 1.4$; errors are 2 sigma and represent estimates of absolute accuracy. The C-H bond dissociation energy in CH_3SCH_3 obtained from our data, 93.7 ± 1.4 kcal/mol at 298 K and 92.0 ± 1.4 kcal at 0 K, agrees well with a recent molecular beam photofragmentation study but is 3 kcal/mol lower than the value obtained from an iodination kinetics study.

Author

Reaction Kinetics; Heat of Dissociation; Radicals; Photolysis; Atmospheric Chemistry; Bromine Compounds; Heat of Formation; Temperature Dependence

19980015259 Georgia Tech Research Inst., Electro-optics and Physical Sciences Lab., Atlanta, GA USA

Halogen and Sulfur Reactions Relevant to Polar Chemistry

Wine, Paul H., Georgia Tech Research Inst., USA; Nicovich, J. Michael, Georgia Tech Research Inst., USA; Stickel, Robert E., Georgia Tech Research Inst., USA; Zhao, Z., Georgia Inst. of Tech., USA; Shackleford, C. J., Georgia Inst. of Tech., USA; Kreuter, K. D., Georgia Tech Research Inst., USA; Daykin, E. P., Georgia Tech Research Inst., USA; Wang, S., Georgia Tech Research Inst., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997, pp. 72-82; Repr. from NATO ASI Series, The Tropospheric Chemistry of Ozone in the Polar Regions, v17, 1993 p 72-82; In English; Also announced as 19980015254 Contract(s)/Grant(s): NAGw-1001; NSF ATM-9104807; E-8904-038; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

It is widely hypothesized that catalytic cycles involving $\text{BrO}(x)$ species play an important role in the episodic destruction of ground-level ozone which is observed in the springtime Arctic boundary layer, although the exact mechanism for production of $\text{BrO}(x)$ radicals remains an open question [Barrie et al., Bottenheim et al.; Finlayson-Pitts et al., McConnell et al.] The critical evidence linking ozone depletion with $\text{BrO}(x)$ chemistry is an observed negative correlation between ozone and filterable bromine [Bottenheim et al., Kieser et al.] In a recent field study of springtime Arctic boundary layer chemistry [Kieser et al.] ozone concentrations and ethane concentrations were found to be correlated; this observation suggests chlorine atoms (which react rapidly with ethane) may also be an important catalyst for ozone destruction under springtime Arctic conditions.

Derived from text

Bromine Compounds; Halogens; Sulfur; Ozone Depletion; Arctic Regions; Catalysts; Cycles; Bromine; Boundary Layers

19980015260 Georgia Tech Research Inst., School of Earth and Atmospheric Sciences, Atlanta, GA USA

Kinetics of the $\text{BrO} + \text{NO}_2$ Association Reaction. Temperature and Pressure Dependence in the Falloff Regime

Thron, R. P., Georgia Tech Research Inst., USA; Daykin, E. P., Georgia Tech Research Inst., USA; Wine, P.H., Georgia Tech Research Inst., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0538-8066, pp. 83-99; Repr. from International Journal of Chemical Kinetics, v25, 1993 p 521-537; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

A laser flash photolysis-long path absorption technique has been employed to study the kinetics of the reaction $\text{BrO} + \text{NO}_2 + \text{M}$ yields (k_1) products as a function of temperature (248-346 K), pressure (16-800 torr), and buffer gas identity (N_2, CF_4) The reaction is found to be in the falloff regime between third and second-order over the entire range of conditions investigated This is the first study where temperature-dependent measurements of $k_1(P,T)$ have been reported at pressures greater than 12 torr;

hence, our results help constrain choices of $k_1(P,T)$ for use in models of lower stratospheric BrO(x) chemistry. Approximate falloff parameters in a convenient form for atmospheric modeling are derived.

Author

Bromine Compounds; Nitrogen; Temperature Dependence; Pressure Dependence; Photolysis; Atmospheric Models; Association Reactions; Methane

19980015261 Georgia Inst. of Tech., Physical Sciences Lab., Atlanta, GA USA

Temperature-Dependent Kinetics Studies of the Reactions $\text{Br}(\text{sup } 2)\text{P}_3/2 + \text{H}_2\text{S}$ yields $\text{SH} + \text{HBr}$ and $\text{Br}(\text{sup } 2)\text{P}_3/2 + \text{CH}_3\text{SH}$ yields $\text{CH}_3\text{S} + \text{HBr}$. Heats of Formation of SH and CH₃S Radicals

Nicovich, J. M., Georgia Inst. of Tech., USA; Kreutter, K. D., Georgia Inst. of Tech., USA; vanDijk, C. A., Georgia Inst. of Tech., USA; Wine, P. H., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0022-3654, pp. 100-111; Repr. from J. Phy. Chem., v96, 1992 p 2518-2528; In English; Also announced as 19980015254 Contract(s)/Grant(s): NAGw-1001; NSF ATM-8802386; NSF ATM-9104807; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

Time resolved resonance fluorescence detection of $\text{Br}(\text{sup } 2)\text{P}_3/2$ atom disappearance or appearance following 266-nm laser flash photolysis of $\text{CF}_2\text{Br}_2/\text{H}_2\text{S}/\text{H}_2/\text{N}_2$, $\text{CF}_2\text{Br}_2/\text{CH}_3\text{SH}/\text{H}_2/\text{N}_2$, $\text{Cl}_2\text{CO}/\text{H}_2\text{S}/\text{HBr}/\text{N}_2$, and $\text{CH}_3\text{SSCH}_3/\text{HBr}/\text{H}_2/\text{N}_2$ mixtures has been employed to study the kinetics of the reactions $\text{Br}(\text{sup } 2)\text{P}_3/2 + \text{H}_2\text{S} = \text{SH} + \text{HBr}$ (1,-1) and $\text{Br}(\text{sup } 2)\text{P}_3/2 + \text{CH}_3\text{SH} = \text{CH}_3\text{S} + \text{HBr}$ (2, -2) as a function of temperature over the range 273-431K. Arrhenius expressions in units of $10(\text{exp } -12)$ cu cm/molecule/s which describe the results are $k_1 = (14.2 \pm 3.4) \exp[(-2752 \pm 90)/T]$, $k_{-1} = (4.40 \pm 0.92) \exp[(-971 \pm 73)/T]$, $k_2 = (9.24 \pm 1.15) \exp[(-386 \pm 41)/T]$, and $k_{-2} = (1.46 \pm 0.21) \exp[(-399 \pm 41)/T]$; errors are 2 sigma and represent precision only. by examining $\text{Br}(\text{sup } 2)\text{P}_3/2$ equilibrium kinetics following 355nm laser flash photolysis of $\text{Br}_2/\text{CH}_3\text{SH}/\text{H}_2/\text{N}_2$ mixtures, a 298 K rate coefficient of $(1.7 \pm 0.5) \times 10(\text{exp } -10)$ cu cm/molecule/s has been obtained for the reaction $\text{CH}_3\text{S} + \text{Br}_2$ yields $\text{CH}_3\text{SBr} + \text{Br}$. to our knowledge, these are the first kinetic data reported for each of the reactions studied. Measured rate coefficients, along with known rate coefficients for similar radical + H_2S , CH_3SH , HBr , Br_2 reactions are considered in terms of possible correlations of reactivity with reaction thermochemistry and with IP - EA, the difference between the ionization potential of the electron donor and the electron affinity of the electron acceptor. Both thermochemical and charge-transfer effects appear to be important in controlling observed reactivities. Second and third law analyses of the equilibrium data for reactions 1 and 2 have been employed to obtain the following enthalpies of reaction in units of kcal/mol: for reaction 1, $\Delta\text{-H}(298) = 3.64 \pm 0.43$ and $\Delta\text{-H}(0) = 3.26 \pm 0.45$; for reaction 2, $\Delta\text{-H}(298) = -0.14 \pm 0.28$ and $\Delta\text{-H}(0) = -0.65 \pm 0.36$. Combining the above enthalpies of reaction with the well-known heats of formation of Br, HBr, H_2S , and CH_3SH gives the following heats of formation for the RS radicals in units of kcal/mol: $\Delta\text{-H}(\text{sub f})(\text{sub } 0)(\text{SH}) = 34.07 \pm 0.72$, $\Delta\text{-H}(\text{sub f})(\text{sub } 298)(\text{SH}) = 34.18 \pm 0.68$, $\Delta\text{-H}(\text{sub f})(\text{sub } 0)(\text{CH}_3\text{S}) = 31.44 \pm 0.54$, $\Delta\text{-H}(\text{sub f})(\text{sub } 298)(\text{CH}_3\text{S}) = 29.78 \pm 0.44$; errors are 2 sigma and represent estimates of absolute accuracy. The SH heat of formation determined from our data agrees well with literature values but has reduced error limits compared to other available values. The CH_3S heat of formation determined from our data is near the low end of the range of previous estimates and is 3-4 kcal/mol lower than values derived from recent molecular beam photofragmentation studies.

Author

Temperature Dependence; Resonance Fluorescence; Bromine Compounds; Heat of Formation; Hydrogen; Reaction Kinetics; Nitrogen; Charge Transfer; Hydrogen Sulfide; Photolysis; Thermochemistry

19980015262 Georgia Tech Research Inst., Physical Sciences Lab., Atlanta, GA USA

Deuterium Substitution used as a Tool for Investigating Mechanisms of Gas-Phase Free-Radical Reactions

Wine, P. H., Georgia Tech Research Inst., USA; Hynes, A. J., Georgia Tech Research Inst., USA; Nicovich, J. M., Georgia Tech Research Inst., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0097-6156, pp. 125-142; Repr. from ACS Symposium Series , Isotope Effects in Gas-Phase Chemistry, no. 502, 1992; In English; 201st; Isotope Effects in Gas-Phase Chemistry, 14-19 Apr. 1991, Atlanta, GA, USA; Sponsored by American Chemical Society, USA; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; NSF ATM-8217232; NSF ATM-8600892; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

Results are presented and discussed for a number of gas phase free radical reactions where H/D isotope effects provide valuable mechanistic insights. The cases considered are (1) the reactions of OH, NO₃, and Cl with atmospheric reduced sulfur compounds, (2) the reactions of OH and OD with CH₃CN and CD₃CN, and (3) the reactions of alkyl radicals with HBr and DBr.

Author

Deuterium; Free Radicals; Vapor Phases; Alkyl Compounds; Sulfur Compounds; Chemical Reactions; Reaction Kinetics; Atmospheric Chemistry

19980015263 Georgia Inst. of Tech., Physical Sciences Lab., Atlanta, GA USA

Kinetics and Thermochemistry of the Br(^{sup 2}P_{3/2}) + NO₂ Association Reaction

Kreutter, K. D., Georgia Inst. of Tech., USA; Nicovich, J. M., Georgia Inst. of Tech., USA; Wine, P. H., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0022-3654, pp. 150-158; Repr. from Journal of Physical Chemistry, v95, 1991; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; NSF ATM-88-02386; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

A laser flash photolysis-resonance fluorescence technique has been employed to study the kinetics of the Br(^{sup 2}P_{3/2}) + NO₂ association reaction as a function of temperature (259-432 K) pressure (12.5 - 700 Torr), and buffer gas identity (He, Ar, H₂, N₂, CO₂, CF₄, SF₆). The reaction is found to be in the falloff regime between third and second order over the entire range of conditions investigated. At temperatures below 350 K, the association reaction is found to be irreversible on the time scale of the experiment (approximately 30 ms). At higher temperatures reversible addition is observed, allowing equilibrium constants for BrNO₂ formation and dissociation to be determined. Second- and third-law analyses of the equilibrium data are in only fair agreement and lead to the following thermochemical parameters for the association reaction: ΔH(298) = 19.6 ± 1.7 kcal/mol, ΔH(0) = -18.6 ± 2.0 kcal/mol, ΔS(298) = 29.3 ± 4.2 cal/mol/K, ΔH(sub f)(sub 298)(BrNO₂) = 17.0 ± 1.8 kcal/mol (uncertainties are 2 sigma estimates of absolute accuracy). The value for ΔH(0) determined in this study has been employed to calculate k(sub 0)(sup SC), the low-pressure third-order rate coefficient in the strong collision limit, by using the method of Troe; calculated values of k(sub 0)(sup SC) are inconsistent with experimental results unless ΔH(0) is assigned a value near the lower limit derived from analysis of the high-temperature approach to equilibrium data, i.e. ΔH(0) approximately equals -16.6 kcal/mol. A potential source of systematic error in the calculation of both k(sub 0)(sup SC) and the absolute entropy of BrNO₂ results from the complete lack of knowledge of the energies and degeneracies of the electronic states of BrNO₃. The procedure developed by Troe and co-workers has been employed to extrapolate experimental falloff curves to the low- and high-pressure limits. Derived values for k(sub 0)(M, 298K) in units of 10(exp -31) cm(exp 6)/sq molecule/s range from 2.75 for M = He to 6.54 for M = CO₂; 2 sigma uncertainties are estimated to be ± 20%. Values for k(sub 0)(N₂, T) in units of 10(exp -31) cm(exp 6)/sq molecule/s are 5.73 at 259 K, 4.61 at 298 K, and 3.21 at 346 K; the observed temperature dependence for k(sub 0)(N₂, T) is consistent with the theoretical temperature dependence for Beta(sub c)k(sub 0)(sup SC). Values for k(sub infinity)(T) in units of 10(exp -11) cu cm/molecule/s are 2.86 at 259 K, 3.22 at 298 K, and 3.73 at 346 K; 2 sigma uncertainties are estimated to be a factor of 2. Approximate falloff parameters in a convenient format for atmospheric modeling are also derived.

Author

Thermochemistry; Nitrogen; Photolysis; Reaction Kinetics; Temperature Dependence; Bromine Compounds; Association Reactions; Carbon Dioxide; Sulfur Hexafluoride; Methane

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Thermochemistry and Kinetics of the Cl+O₂ Association Reaction

Nicovich, J. M., Georgia Tech Research Inst., USA; Kreutter, K. D., Georgia Tech Research Inst., USA; Shackelford, C. J., Georgia Tech Research Inst., USA; Wine, P. H., Georgia Tech Research Inst., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0009-2614, pp. 159-165; Repr. from Chemical Physics Letters, v179, no.4., 26 Apr. 1991 p 367-373; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Laser flash photolysis of Cl₂/O₂ mixtures has been employed in conjunction with Cl(^{sup 2}P_{3/2}) detection by time-resolved fluorescence spectroscopy to investigate equilibration kinetics for the reactions Cl + O₂ + O is in equilibrium with ClOO + O₂ at temperatures of 181-200 K and O₂ pressures of 15-40 Torr. The third-order rate coefficient for the association reaction at 186.5 ± 5.5 K is (8.9 ± 2.9) × 10(exp -33) cm(exp 6) molecule(exp -2) s(exp -1) and the equilibrium constant (K(p)) at 185.4 K is 18.9 atm(exp -1) (factor of 1.7 uncertainty). A third law analysis of our data leads to a value for the Cl-OO bond dissociation energy of 4.76 ± 0.49 kcal/mol(exp -1).

Author

Thermochemistry; Association Reactions; Reaction Kinetics; Atmospheric Chemistry; Chlorine Oxides

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Kinetics and Mechanism of the Reaction of Hydroxyl Radicals with Acetonitrile under Atmospheric Conditions

Hynes, A. J., Georgia Inst. of Tech., USA; Wine, P. H., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0022-3654, pp. 166-174; Repr. from Journal of Physical Chemistry, V95, 1991; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; NSF ATM-88-02386; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The pulsed laser photolysis-pulsed laser induced fluorescence technique has been employed to determine absolute rate coefficients for the reaction $\text{OH} + \text{CH}_3\text{CN}$ (1) and its isotopic variants, $\text{OH} + \text{CD}_3\text{CN}$ (2), $\text{OD} + \text{CH}_3\text{CN}$ (3), and $\text{OD} + \text{CD}_3\text{CN}$ (4). Reactions 1 and 2 were studied as a function of pressure and temperature in N_2 , N_2/O_2 , and He buffer gases. In the absence of O_2 all four reactions displayed well-behaved kinetics with exponential OH decays and pseudo-first rate constants which were proportional to substrate concentration. Data obtained in N_2 over the range 50-700 Torr at 298 K are consistent with $k(\text{sub } 1)(\text{T}) = (1.1(\text{sup } +0.5)/(\text{sub } -0.3)) \times 10(\text{exp } -12) \exp[(-1130 \pm 90)/\text{T}] \text{ cu cm}/(\text{molecule s})$. The kinetics of reaction 2 are found to be pressure dependent with $k(\text{sub } 2)$ (298 K) increasing from $(1.21 \pm 0.12) \times 10(\text{exp } -14)$ to $(2.16 \pm 0.11) \times 10(\text{exp } -14) \text{ cm}(\text{exp } 3)/(\text{molecule s})$ over the pressure range 50-700 Torr of N_2 at 298 K. Data at pressures greater than 600 Torr give $k(\text{sub } 2)(\text{T}) = (9.4(\text{sup } +13.4)(\text{sub } -5.0)) \times 10(\text{exp } -13) \exp[(-1180 \pm 250)/\text{T}] \text{ cu cm}/(\text{molecule s})$. The rates of reactions 3 and 4 are found to be independent of pressure over the range 50-700 Torr of N_2 with 298 K rate coefficient given by $k(\text{sub } 3) = (3.18 \pm 0.40) \times 10(\text{exp } -14) \text{ cu cm}/(\text{molecule s})$ and $k(\text{sub } 4) = (2.25 \pm 0.28) \times 10(\text{exp } -14) \text{ cu cm}/(\text{molecule s})$. In the presence of O_2 each reaction shows complex (non-pseudo-first-order) kinetic behavior and/or an apparent decrease in the observed rate constant with increasing $[\text{O}_2]$, indicating the presence of significant OH or OD regeneration. Observation of regeneration of OH in (2) and OD in (3) is indicative of a reaction channel which proceeds via addition followed by reaction of the adduct, or one of its decomposition products, with O_2 . The observed OH and OD decay profiles have been modeled by using a simple mechanistic scheme to extract kinetic information about the adduct reactions with O_2 and branching ratios for OH regeneration. A plausible mechanism for OH regeneration in (2) involves OH addition to the nitrogen atom followed by O_2 addition to the cyano carbon atom, isomerization and decomposition to $\text{D}_2\text{CO} + \text{DOCN} + \text{OH}$. Our results suggest that the $\text{OH} + \text{CH}_3\text{CN}$ reaction occurs via a complex mechanism involving both bimolecular and termolecular pathways, analogous to the mechanisms for the important atmospheric reactions of OH with CO and HNO_3 .

Author

Reaction Kinetics; Chemical Reactions; Acetonitrile; Atmospheric Chemistry; Hydroxyl Radicals

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A Competitive Kinetics Study of the Reaction of Cl with CS₂ in Air at 298 K

Wallington, Timothy J., Ford Motor Co., USA; Andino, Jean M., Ford Motor Co., USA; Potts, Alan R., Ford Motor Co., USA; Wine, Paul H., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0009-2614, pp. 175-180; Repr. form Chemical Physics Letters, v176, no.1, 4 Jan. 1991 p 103-108; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; NSF ATM-88-02386; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The relative rate technique has been used to investigate the kinetics of the reaction of Cl atoms with carbon disulfide, CS_2 , at 700 Torr total pressure of air at 298 K. The decay rate of CS_2 was measured relative to CH_4 , CH_3Cl and CHF_2Cl . For experiments using CH_4 and CH_3Cl references, the decay rate of CS_2 was dependent on the ratio of the concentration of the reference to that of CS_2 . We ascribe this behavior to the generation of OH radicals in the system leading to complicated secondary chemistry. From experiments using CHF_2Cl we are able to assign an upper limit of $4 \times 10(\text{exp } -15) \text{ cu cm}/(\text{molecule s})$ for the overall reaction, $\text{Cl} + \text{CS}_2$ yields products.

Author

Carbon Disulfide; Reaction Kinetics; Chemical Reactions; Atmospheric Chemistry; Chlorine

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Kinetics of the Reactions of IO Radicals with NO and NO₂

Daykin, E. P., Georgia Inst. of Tech., USA; Wine, P. H., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0022-3654, pp. 181-188; Repr. from Journal of Physical Chemistry, v94, 1990; In English; Also announced as 19980015254

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A laser flash photolysis-long path absorption technique has been employed to study the kinetics of the reactions of IO radicals with NO and NO_2 as a function of temperature and pressure. The IO and NO rate coefficient is independent of pressure over the

range 40-200 Torr of N₂, and its temperature dependence over the range 242-359 K is adequately described by the Arrhenius expression $k(\text{sub } 1) = (6.9 \pm 1.7) \times 10(\text{exp } -12) \exp[(328 \pm 71)/T]$ cu cm/(molecule.s) (errors are 2 sigma, precision only). These Arrhenius parameters are similar to those determined previously for the ClO + NO and BrO + NO reactions. The IO and NO₂ association reaction is found to be in the falloff regime over the temperature and pressure ranges investigated (254-354 K and 40-750 Torr of N₂). Assuming $F(\text{sub } c) = 0.4$ independent of temperature, a physically reasonable set of falloff parameters which adequately describe the data are $k(\text{sub } 0) = 7.7 \times 10(\text{exp } -31)(T/300)(\text{exp } -5.0)$ cm(exp 6)/(molecule(exp 2).s) and $k(\text{sub } \infty) = 1.55 \times 10(\text{exp } -11)$ cu cm/(molecule.s) independent of temperature. The IO + NO₂ rate coefficients determined in this study are about a factor of 2 faster than those reported in the only previous study of this reaction.

Author

Association Reactions; Nitric Oxide; Nitrogen Dioxide; Chemical Reactions; Atmospheric Chemistry; Iodine

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Kinetics of the Reactions of Cl((sup 2)P(sub J)) and Br((sup 2)P(sub 3/2)) with O₃

Nicovich, J. M., Georgia Inst. of Tech., USA; Kreutter, K. D., Georgia Inst. of Tech., USA; Wine, P. H., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0538-8066, pp. 189-204; Repr. from InterNational Journal of Chemical Kinetics, v22, 1990 p 399-414; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

A laser flash photolysis-resonance fluorescence technique has been employed to study the kinetics of the important stratospheric reactions Cl((sup 2)P(sub J)) + O₃ yields ClO + O₂ and Br((sup 2)P(sub 3/2)) + O₃ yields BrO + O₂ as a function of temperature. The temperature dependence observed for the Cl((sup 2)P(sub J)) + O₃ reaction is nonArrhenius, but can be adequately described by the following two Arrhenius expressions (units are cu cm/(molecule.s), errors are 2 sigma and represent precision only): $k(\text{sub } 1)(T) = (1.19 \pm 0.21) \times 10(\text{exp } -11) \exp[(-33 \pm 37)/T]$ for T = 189-269 K and $k(\text{sub } 1)(T) = (2.49 \pm 0.38) \times 10(\text{exp } -11) \exp[(-233 \pm 46)/T]$ for 269-385 K. At temperatures below 230 K, the rate coefficients determined in this study are faster than any reported previously. Incorporation of our values for $k(\text{sub } 1)(T)$ into stratospheric models would increase calculated ClO levels and decrease calculated HCl levels; hence the calculated efficiency of ClO catalyzed ozone destruction would increase. The temperature dependence observed for the Br((sup 2)P(sub 3/2)) + O₃ reaction is adequately described by the following Arrhenius expression (units are cu cm/(molecule.s), errors are 2 sigma and represent precision only): $k(\text{sub } 2)(T) = (1.50 \pm 0.16) \times 10(\text{exp } -11) \exp[(-775 \pm 30)/T]$ for 195-392 K. While not in quantitative agreement with Arrhenius parameters reported in most previous studies, our results almost exactly reproduce the average of all earlier studies and therefore will not affect the choice of $k(\text{sub } 2)(T)$ for use in modeling stratospheric BrO₂ chemistry.

Author

Atmospheric Chemistry; Reaction Kinetics; Photolysis; Chlorine Compounds; Bromine Compounds

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Kinetics of the Reactions of O((sup 3)P) and Cl((sup 2)P) with HBr and Br₂

Nicovich, J. M., Georgia Inst. of Tech., USA; Wine, P. H., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0538-8066, pp. 205-223; Repr. from InterNational Journal of Chemical Kinetics, V22, 1990 p 379-397; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

A laser flash photolysis-resonance fluorescence technique has been employed to study the kinetics of reactions (1)-(4) as a function of temperature. (1) O((sup 3)P) + Br₂ yields BrO + Br((sup 2)P(sub 3/2)) at 255-350 K; (2) Cl((sup 2)P) + Br₂ yields BrCl + Br((sup 2)P(sub 3/2)) at 298-401 K; (3) O((sup 3)P) + HBr yields OH + Br((sup 2)P(sub J)) at 250-402 K; (4) Cl((sup 2)P) + HBr yields HCl + Br((sup 2)P(sub J)) at 257-404 K. In all cases, the concentration of the excess reagent, i.e. HBr or Br₂, was measured in situ in the slow flow system by UV-visible photometry. Heterogeneous dark reactions between XBr (X equals H or Br) and the photolytic precursors for Cl((sup 2)P) and O((sup 3)P) (Cl₂ and O₃, respectively) were avoided by injecting minimal amounts of precursor into the reaction mixture immediately upstream from the reaction zone. The following Arrhenius expressions summarize our results (errors are 2 sigma and represent precision only, units are cu cm/(molecule.s): $k(\text{sub } 1) = (1.76 \pm 0.80) \times 10(\text{exp } -11) \exp[(40 \pm 100)/T]$; $k(\text{sub } 2) = (2.40 \pm 1.25) \times 12(\text{exp } -10) \exp[(-144 \pm 176)/T]$; $k(\text{sub } 3) = (5.11 \pm 2.82) \times 10(\text{exp } -12) \exp[(-1450 \pm 160)/T]$; $k(\text{sub } 4) = (2.25 \pm 0.56) \times 10(\text{exp } -11) \exp[(-400 \pm 80)/T]$. The consistency (or lack thereof) of our results with those reported in previous kinetics and dynamics studies of reactions (1)-(4) is discussed.

Author

Photolysis; Reaction Kinetics; Bromine Compounds; Atmospheric Chemistry; Chlorine Compounds

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Kinetics and Thermochemistry of Reversible Adduct Formation in the Reaction of $\text{Cl}((\text{sup } 2)\text{P}(\text{sub } \text{J}))$ with CS_2

Nicovich, J. M., Georgia Inst. of Tech., USA; Shackelford, C. J., Georgia Inst. of Tech., USA; Wine, P. H., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0022-3654, pp. 224-231; Repr. from Journal of Physical Chemistry, v94, 1990; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; NSF ATM-88-02386; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Reversible adduct formation in the reaction of $\text{Cl}((\text{sup } 2)\text{P}(\text{sub } \text{J}))$ with CS_2 has been observed over the temperature range 193-258 K by use of time-resolved resonance fluorescence spectroscopy to follow the decay of pulsed-laser-generated $\text{Cl}((\text{sup } 2)\text{P}(\text{sub } \text{J}))$ into equilibrium with CS_2Cl . Rate coefficients for CS_2Cl formation and decomposition have been determined as a function of temperature and pressure; hence, the equilibrium constant has been determined as a function of temperature. A second-law analysis of the temperature dependence of K_P and heat capacity corrections calculated with use of an assumed CS_2Cl structure yields the following thermodynamic parameters for the association reaction: $\Delta H(\text{sub } 298) = -10.5 \pm 0.5$ kcal/mol, $\Delta H(\text{sub } 0) = -9.5 \pm 0.7$ kcal/mol, $\Delta S(\text{sub } 298) = -26.8 \pm 2.4$ cal/mol.deg., and $\Delta H(\text{sub } f, 298)(\text{CS}_2\text{Cl}) = 46.4 \pm 0.6$ kcal/mol. The resonance fluorescence detection scheme has been adapted to allow detection of $\text{Cl}((\text{sup } 2)\text{P}(\text{sub } \text{J}))$ in the presence of large concentrations of O_2 , thus allowing the $\text{CS}_2\text{Cl} + \text{Cl} + \text{O}_2$ reaction to be investigated. We find that the rate coefficient for $\text{CS}_2\text{Cl} + \text{O}_2$ reaction via all channels that do not generate $\text{Cl}((\text{sup } 2)\text{P}(\text{sub } \text{J}))$ is less than $2.5 \times 10(\text{exp } -16)$ cu cm/(molecule.s) at 293 K and 300-Torr total pressure and that the total rate coefficient is less than $2 \times 10(\text{exp } -15)$ cu cm/(molecule.s) at 230 K and 30-Torr total pressure. Evidence for reversible adduct formation in the reaction of $\text{Cl}((\text{sup } 2)\text{P}(\text{sub } \text{J}))$ with COS was sought but not observed, even at temperatures as low as 194 K.

Author

Thermochemistry; Thermodynamic Properties; Association Reactions; Resonance Fluorescence; Specific Heat

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Kinetics and Thermochemistry of ClCO Formation from the $\text{Cl} + \text{CO}$ Association Reaction

Nicovich, J. M., Georgia Inst. of Tech., USA; Kreutter, K. D., Georgia Inst. of Tech., USA; Wine, P. H., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0021-9606, pp. 232-237; Repr. from J. Chem. Phys., v92, no.6, 15 Mar. 1990 p 3539-3544; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Laser flash photolysis of $\text{Cl}_2/\text{CO}/\text{M}$ mixtures ($\text{M} = \text{N}_2, \text{CO}, \text{Ar}, \text{CO}_2$) has been employed in conjunction with $\text{Cl}((\text{sup } 2)\text{P}(\text{sub } \text{J}))$ detection by time-resolved resonance fluorescence spectroscopy to investigate equilibration kinetics in the reactions $\text{Cl}((\text{sup } 2)\text{P}(\text{sub } \text{J})) + \text{CO} \rightleftharpoons \text{ClCO}$ as a function of temperature (185-260 K) and pressure (14-200 Torr). The association and dissociation reactions are found to be in the low-pressure limit over the range of experimental conditions investigated. In N_2 and/or CO buffer gases, the temperature dependences of the ClCO formation and dissociation reaction rate constants are described by the Arrhenius expressions $k(\text{sub } 1) = (1.05 \pm 0.36) \times 10(\text{exp } -34) \exp[(810 \pm 70)/T]$ cm(exp 6)/molecules(exp 2).s and $k(\text{sub } -1) = (4.1 \pm 3.1) \times 10(\text{exp } -10) \exp[(-2960 \pm 60)/T]$ cu cm/(molecule.s) (errors are 2 sigma). Second- and third-law analyses of the temperature dependence of the equilibrium constant (k/k_{-1}) lead to the following thermodynamic parameters for the association reaction: $\Delta H(\text{sub } 298) = -7.7 \pm 0.6$ kcal/mol, $\Delta H(\text{sub } 0) = -6.9 \pm 0.7$ kcal/mol, $\Delta S(\text{sub } 298) = -23.8 \pm 2.0$ cal/mole.K, $\Delta H(\text{sub } f, 298)(\text{ClCO}) = 5.2 \pm 0.6$ kcal/mol (errors are 2 sigma). The results reported in this study significantly reduce the uncertainties in all reported kinetic and thermodynamic parameters.

Author

Association Reactions; Resonance Fluorescence; Temperature Dependence; Thermochemistry; Thermodynamic Properties

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Kinetics of the Br_2 - CH_3CHO Photochemical Chain Reaction

Nicovich, J. M., Georgia Inst. of Tech., USA; Shackelford, C. J., Georgia Inst. of Tech., USA; Wine, P. H., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 1010-6030, pp. 238-250; Repr. from Journal of Photochemistry and Photobiology, A: Chemistry, v51, 1990 p141-153; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; EPA-R814527; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

Time-resolved resonance fluorescence spectroscopy was employed in conjunction with laser flash photolysis of Br_2 to study the kinetics of the two elementary steps in the photochemical chain reaction $n\text{Br}_2 + n\text{CH}_3\text{CHO} + h\nu \text{ yields } n\text{CH}_3\text{CBrO} + n\text{HBr}$. In the temperature range 255-400 K, the rate coefficient for the reaction $\text{Br}((\text{sup } 2)\text{P}(\text{sub } 3/2)) + \text{CH}_3\text{CHO} \text{ yields } \text{CH}_3\text{CO} + \text{HBr}$ is given by the Arrhenius expression $k(\text{sub } 6)(T) = (1.51 \pm 0.20) \times 10(\text{exp } -11) \exp(-(364 \pm 41)/T)$ cu cm/(molecule.s). At 298

K, the reaction $\text{CH}_3\text{CO} + \text{Br}_2$ yields $\text{CH}_3\text{CBrO} + \text{Br}$ proceeds at a near gas kinetic rate, $k(\text{sub } 7)(298 \text{ K}) = (1.08 \pm 0.38) \times 10^{10} \text{ cm}^3/(\text{molecule} \cdot \text{s})$.

Author

Photochemical Reactions; Acetaldehyde; Kinetics; Fluid Mechanics

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Kinetics of the Reactions of $\text{F}(\text{sup } 2\text{P})$ and $\text{Cl}(\text{sup } 2\text{P})$ with HNO_3

Wine, P. H., Georgia Inst. of Tech., USA; Wells, J. R., Georgia Inst. of Tech., USA; Nicovich, J. M., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0022-3654, pp. 261-266; Repr. from Journal of Physical Chemistry, v92, no. 8, 1988 p 2223-2228; In English; Also announced as 19980015254

Contract(s)/Grant(s): NAGw-1001; NSF ATM-86-00892; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The kinetics of the reactions of HNO_3 with fluorine ($k(\text{sub } 1)$) and Chlorine ($k(\text{sub } 2)$) atoms have been studied by using a time-resolved long-path laser absorption technique to monitor the appearance of product NO_3 radicals following 351-nm pulsed laser photolysis of $\text{X}_2/\text{HNO}_3/\text{He}$ mixtures ($\text{X} = \text{F}, \text{Cl}$). Absolute rate coefficients for the $\text{F}(\text{sup } 2\text{P}) + \text{HNO}$ reaction have been determined over the temperature range 260-373 K. Between 260 and 320 K, the data are adequately represented by the Arrhenius expression $k(\text{sub } 1)(\text{T}) = (6.0 \pm 2.6) \times 10^{12} \exp[(40 \pm 120)/\text{T}] \text{ cm}^3/(\text{molecule} \cdot \text{s})$. Between 335 and 373 K, the rate coefficient is found to be $(2.0 \pm 0.3) \times 10^{11} \text{ cm}^3/(\text{molecule} \cdot \text{s})$ independent of temperature. The observed temperature dependence suggests that reaction proceeds via competing direct abstraction and complex pathways. No NO_3 production was observed in the experiments with X equals Cl , thus establishing that $k(\text{sub } 2)(298 \text{ K})$ is less than $2 \times 10^{16} \text{ cm}^3/(\text{molecule} \cdot \text{s})$. The $\text{Cl}(\text{sup } 2\text{P}) + \text{HNO}$ reaction was also investigated by using a pulsed laser photolysis-resonance fluorescence technique to monitor the decay of $\text{Cl}(\text{sup } 2\text{P})$. Upper limit values for $k(\text{sub } 2)$ obtained from these experiments, in units of $10^{16} \text{ cm}^3/(\text{molecule} \cdot \text{s})$, are 13 at 298 K and 10 at 400 K.

Author

Chlorine; Nitric Acid; Photolysis; Reaction Kinetics; Resonance; Temperature Dependence

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Temperature Dependence of the $\text{O} + \text{HO}_2$ Rate Coefficient

Nicovich, J. M., Georgia Inst. of Tech., USA; Wine, P. H., Georgia Inst. of Tech., USA; Laboratory Investigations of Stratospheric Halogen Chemistry; Apr. 09, 1997; ISSN 0022-3654, pp. 272-277; Repr. from Journal of Physical Chemistry, v91, 1987 p 5118-5123; In English; Also announced as 19980015254

Contract(s)/Grant(s): JPL-954814; NAGw-1001; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

A pulsed laser photolysis technique has been employed to investigate the kinetics of the radical-radical reaction $\text{O}(\text{sup } 3\text{P}) + \text{HO}_2 \rightarrow \text{OH} + \text{O}_2$ over the temperature range 266-391 K in 80 Torr of N_2 diluent gas. $\text{O}(\text{sup } 3\text{P})$ was produced by 248.5-nm KrF laser photolysis of O_3 followed by rapid quenching of $\text{O}(1\text{D})$ to $\text{O}(\text{sup } 3\text{P})$ while HO_2 was produced by simultaneous photolysis of H_2O_2 to create OH radicals which, in turn, reacted with H_2O_2 to yield HO_2 . The $\text{O}(\text{sup } 3\text{P})$ temporal profile was monitored by using time-resolved resonance fluorescence spectroscopy. The HO_2 concentration was calculated based on experimentally measured parameters. The following Arrhenius expression describes our experimental results: $k(\text{sub } 1)(\text{T})$ equals $(2.91 \pm 0.70) \times 10^{11} \exp[(228 \pm 75)/\text{T}]$ where the errors are 2 sigma and represent precision only. The absolute uncertainty in k , at any temperature within the range 266-391 K is estimated to be ± 22 percent. Our results are in excellent agreement with a discharge flow study of the temperature dependence of $k(\text{sub } 1)$ in 1 Torr of He diluent reported by Keyser, and significantly reduce the uncertainty in the rate of this important stratospheric reaction at subambient temperatures.

Author

Rapid Quenching (Metallurgy); Reaction Kinetics; Resonance Fluorescence; Photolysis; Temperature Dependence

19980015418 Maryland Univ., Dept. of Fire Protection Engineering, College Park, MD USA

Full-Scale Room Fire Experiments

McGarry, A. J., Maryland Univ., USA; Milke, J. A., Maryland Univ., USA; Mar. 1997; 29p; In English Report No.(s): PB97-184022; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Two full-size furnished bedrooms were burned, September 19, at the University of Maryland Fire and Rescue Institute Facilities. It was intended that these two burns be identical, to see if close analysis of the results would find differences. Some differences were noticed possible due to small differences in the inflow of ventilation air. In both cases, ignition of a gasoline spill next to an upholstered chair was used to initiate the fire. This report describes the test arrangement results.

NTIS

Rescue Operations; Seats; Spilling; Ventilation

19980016006 Kentucky Univ., Dept. of Mechanical Engineering, Lexington, KY USA

Fire Spread along the Vertical Corner Wall, Part 1 Final Report

Saito, K., Kentucky Univ., USA; Oct. 1997; 50p; In English

Report No.(s): PB98-110232; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Flame spread behavior and the pyrolysis region and spread characteristics along vertical corner walls were studied in detail with an automated infrared imaging temperature measurement technique (IR technique). Temporal isotherms on PMMA samples were successfully obtained, from which the progress rate of the pyrolysis front was automatically deduced. It was found that the pyrolysis front shape was always M-shaped, i.e., no spread along the corner, and the maximum spread is in a few centimeters away from the corner. Four possible mechanisms were identified and flame displacement effects are found to be the principal mechanism. Transient total heat flux distributions above the M-shape pyrolysis peak for a spreading fire were measured. Using these values, it was shown that the upward spread rate is predictable from a simple, one-dimensional, thermal model.

NTIS

Walls; Burning Rate; Flame Propagation; Temperature Measurement

19980016312 Wisconsin Univ., Dept. of Mechanical Engineering, Milwaukee, WI USA

Flamelet Structure of Radiating CH₄-Air Flames Annual Report, Aug. 1993 - Dec. 1994

Chan, S. H., Wisconsin Univ., USA; Jan. 1995; 34p; In English

Report No.(s): PB96-128400; UWM-ME-R-93/94-001; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The structure of laminar flamelets of CH₄-air diffusion flames is presented. The predictions are based on the solution of a one-dimensional set of conservation equations with the mixture fraction, f , as the independent variable for different fixed values of the scalar dissipation rate, χ . A reduced three-step chemical kinetic mechanism is used for the whole range of f (0 less than or equal to f less than or equal to 1.0). The rates of the three steps are related to the rates of the elementary reactions of the full reaction mechanism. Radiative heat transfer effects are examined by using the optically thin and full radiation models. The results of the numerical computations yield values of the temperature and main species for different values of χ until extinction of the flamelet eventually occurs. Both the adiabatic flamelet and nonadiabatic flamelet with radiative heat loss are studied and their respective flamelet structures are presented.

NTIS

Natural Gas; Diffusion Flames; Radiative Heat Transfer; Radiant Cooling; Conservation Equations; Flames; Laminar Flow; Nonadiabatic Conditions

19980016614 NERAC, Inc., Tolland, CT USA

Catalytic Reduction of Nitrogen Oxides from Waste Gases. (Latest citations from the US Patent Bibliographic File with Exemplary Claims)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-856026; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning catalytic reduction of nitrogen oxides from waste gases. Preparation, properties, and regeneration of catalysts used to reduce nitrogen oxides are discussed. Topics also include cleanup and reduction technologies for flue gas; automotive exhaust gas; and air pollutants resulting from fluidized bed combustion, incinerators, and other waste gas producing systems. Citations of selected foreign patents concerning nitrogen oxide reduction are examined in a related bibliography. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Air Pollution; Nitrogen Oxides; Catalysts; Reduction (Chemistry)

19980016642 Technische Univ., Delft, Netherlands

Turbulence and OH Structures in Flames *Turbulentie en OH Structuren in Vlammen*

Stroomeer, P. P. J., Technische Univ., Netherlands; Jun. 26, 1995; 183p; In English

Report No.(s): PB96-127899; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

Contents include the following: General introduction; Principles of turbulent combustion; Experimental methods; Structure of disk-stabilized premixed flame; Structure of piloted jet diffusion flame.

NTIS

Diffusion Flames; Flames; Turbulent Combustion

19980016647 NERAC, Inc., Tolland, CT USA

Capillary Electrophoresis (Latest Citations from the Life Sciences Collection Database)

May 1996; In English; Page count unavailable

Report No.(s): PB96-869771; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the use of high voltage and tubular capillaries for the isolation, separation, and characterization of proteins and peptides. The citations explore applications in DNA sequencing, peptide mapping, restriction length polymorphism analysis, enantiomeric resolution, antibody characterization, analysis of pharmaceuticals and related methodologies. Physiochemical effects on performance and resolution are briefly cited.

NTIS

Bibliographies; Deoxyribonucleic Acid; Electrophoresis; High Voltages; Life Sciences; Peptides; Physiochemistry; Polymorphism

19980016661 NERAC, Inc., Tolland, CT USA

Ultrafast Spectroscopy. (Latest Citations from the INSPEC Database)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-856208; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the technology and assessment of ultrafast spectroscopy. References examine the types of femtosecond and picosecond spectroscopy and their applications in the studies of semiconductor materials and structures, organic liquids and crystals, metallic thin films, and optical glasses. Topics include time-resolved spectra, pump-probe spectroscopy, quantum wells, multiwave mixing, Raman-induced Kerr effect, electron-phonon and electron-hole interaction, and optical hole burning. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Spectroscopy

19980016861 Environmental Protection Agency, National Risk Management Research Lab., Research Triangle Park, NC USA

Evaluation of Corrosion Issues for Nanofiltration Treated Water

Lytle, D. A., Environmental Protection Agency, USA; Schock, M. R., Environmental Protection Agency, USA; Speth, T. F., Environmental Protection Agency, USA; Swertfeger, J., Environmental Protection Agency, USA; Mar. 1996; 32p; In English; AWWA/USEPA Workshop on GAC and Membranes: Bench and Pilot Scale Evaluations, 4-6 Mar. 1996, Cincinnati, OH, USA

Report No.(s): PB96-159397; EPA/600/A-96/016; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Nanofiltration membranes are known to remove a large percentage of naturally occurring organics. Removal are often higher than 90 percent. This is also true for disinfection byproduct (DBP) precursors. Due to the properties, the Information Collection Rule may require water utilities of a certain size and carbon treatment. It is the objective of this paper to describe the organic and inorganic constituents that are rejected by a nanofiltration membrane, to determine the corrosivity of nanofiltration permeate water by conducting pipe loop experiments, and to evaluate method for mitigating corrosion problems.

NTIS

Filtration; Water Treatment; Membranes; Water Quality; Corrosion; Water Pollution; Pollution Control

19980016886 Ceramtec, Inc., Salt Lake City, UT USA

Development of Thin-Film, Mixed-Conductive Membranes for Oxygen Separation Final Report, 1 Jul. 1990 - 31 Dec. 1993

Shen, Y., Ceramtec, Inc., USA; Boettcher, M., Ceramtec, Inc., USA; Taylor, D., Ceramtec, Inc., USA; Joshi, A., Ceramtec, Inc., USA; Apr. 1994; 249p; In English

Report No.(s): PB96-139472; CERMATEC-9456409; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This report summarized the results of the research project supported by GRI to develop mixed ionic-electronic conductors (MIECs) for pressure driven oxygen separation. Development of highly conductive MIECs has been accomplished by: (1) introduction of multivalent dopants into ionic conductors to generate the electronic imperfection (homogeneous MIECs); (2) formation of an electronically conductive oxide second phase into ionic conductors (metal-oxide composite MIECs); and (4)

introduction of oxygen vacancies into electronic conductive perovskites (perovskite-type MIECs). Tubular and planar cell designs have been compared and the tubular design has been recommended.

NTIS

Thin Films; Membranes; Oxygen

26

METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

19980012530 Naval Surface Warfare Center, Bethesda, MD USA

1997 Tri-Service Conference on Corrosion, Volume 2, Proceedings

Nov. 21, 1997; 582p; In English; 1997 Tri-Service Conference on Corrosion, 17-21 Nov. 1997, Wrightsville Beach, NC, USA
Report No.(s): AD-A332665; No Copyright; Avail: CASI; A25, Hardcopy; A06, Microfiche

Several protection strategies for coastal infrastructure using thermal-spray technology are presented from research at the Albany Research Center. Thermal-sprayed zinc coatings for anodes in impressed current cathodic protection systems are used to extend the service lives of reinforced concrete bridges along the Oregon coast. Thermal-sprayed Ti is examined as an alternative to the consumable zinc anode. Sealed thermal-sprayed Al is examined as an alternative coating to zinc dust filled polyurethane paint for steel structures.

DTIC

Composite Materials; Concretes; Corrosion; Polyurethane Resins; Sprayed Coatings; Sprayers; Steel Structures; Cathodic Coatings; Zinc Coatings

19980012768 Cornell Univ., Dept. of Theoretical and Applied Mechanics, Ithaca, NY USA

Continuum Models for Irregular Phase Boundary Motion in Shape-Memory Tensile Bars

Rosakis, Phoebus, Cornell Univ., USA; Knowles, James K., California Inst. of Tech., USA; Nov. 1997; 32p; In English
Contract(s)/Grant(s): N00014-93-I-0240

Report No.(s): AD-A332658; TR-11; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We consider quasi-static displacement-control led loading through one stress cycle of a shape-memory tensile bar modeled as a one-dimensional, two-phase elastic solid. Our objective is to explore the effect on the associated hysteresis loop of various qualitatively different types of kinetic relations, bearing in mind certain features of such loops that have been observed experimentally. We show that when the model involves a kinetic relation that is 'unstable' in a definite sense, 'stick-slip' motion of the interface between phases and serration of the accompanying stress-elongation curve are both predicted at slow elongation rates. We also show that a 'nonhomogeneous' kinetic relation intended to model the effect of micro-obstacles on interface motion also leads to irregular interface motion and a serrated stress-elongation curve, in this case at all elongation rates.

DTIC

Phase Transformations; Continuum Modeling; Static Loads; Stress Cycles

19980013657 China Nuclear Information Centre, Beijing, China

Corrosion behavior of Zr(Fe, Cr)₂ metallic compounds in superheated steam

Bangxin, Zhou, Nuclear Power Inst. of China, China; Cong, Li, Nuclear Power Inst. of China, China; Zhi, Miao, Nuclear Power Inst. of China, China; Jiyan, Dai, Institute of Metal Research, China; Dec. 1996; 14p; In English; Sponsored in part by Corrosion Science Lab. Academia Sinica.

Contract(s)/Grant(s): IAEA-6250/R2/RB

Report No.(s): CNIC-01111; SINRE-0069; DE97-632428; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

Zr(Fe,Cr)_(sub 2) metallic compounds with different Fe/Cr ratio of 1.75 and 4.50 were prepared by non-consumable arc melting. X-ray diffraction, electron microprobe and Transmission Electron Microscopy (TEM) were employed for analyzing the structure, morphology and re-distribution of composition after the autoclave test of Zr(Fe, Cr)_(sub 2) powder at 500 C superheated steam with different exposure time. The corrosion products are the same for Zr(Fe, Cr)_(sub 2) with different Fe/Cr ratio, but Zr(Fe,Cr)_(sub 2) with Fe/Cr ratio of 1.75 is more resistance to corrosion than that with Fe/Cr ratio of 4.50. Cubic ZrO₂ and alpha Fe-Cr are formed at the beginning of Zr(Fe,Cr)_(sub 2) oxidation, then monoclinic ZrO₂ transformed from cubic ZrO₂ and (Fe, Cr)_(sub 2) oxidation, then monoclinic ZrO₂ transformed from cubic ZrO₂ and (Fe,Cr)_(sub 3)O₄ are observed later. When the segregation of iron and chromium atoms occurs during the oxidation of Zr(Fe,Cr)_(sub 2) metallic compound, the diffusion rate

of iron atoms is faster than that of chromium atoms. Cubic $\text{Zr}_6(\text{Fe,Cr})_3\text{O}$ phase which is coherent with the lattice of $\text{Zr}(\text{Fe,Cr})_2$ on the relationship of $\text{Zr-122}(\text{Fe,Cr})_2/(110)$ ($\text{Zr}_6(\text{Fe,Cr})_3\text{O}$) is observed on the edge of $\text{Zr}(\text{Fe,Cr})_2$ particles which have been embedded in oxide film formed on Zircaloy-4 specimens after the autoclave test in superheated steam.

DOE

Corrosion Resistance; Intermetallics; Zirconium Oxides; Zirconium Alloys

19980013930 Virginia Univ., School of Engineering and Applied Science, Charlottesville, VA USA

NASA-UVA Light Aerospace Alloy and Structure Technology Program Supplement: Aluminum-Based Materials for High Speed Aircraft Final Report, 1 Jan. 1992 - 31 Oct. 1995

Starke, E. A., Jr., Virginia Univ., USA; Dec. 1997; 572p; In English

Contract(s)/Grant(s): NAG1-745; RTOP 537-06-31-20

Report No.(s): NASA/CR-1997-206248; NAS 1.26:206248; UVA/528266/MSE96/120; No Copyright; Avail: CASI; A24, Hardcopy; A04, Microfiche

This is the final report of the study "Aluminum-Based Materials for High Speed Aircraft" which had the objectives (1) to identify the most promising aluminum-based materials with respect to major structural use on the HSCT and to further develop those materials and (2) to assess the materials through detailed trade and evaluation studies with respect to their structural efficiency on the HSCT. The research team consisted of ALCOA, Allied-Signal, Boeing, McDonnell Douglas, Reynolds Metals and the University of Virginia. Four classes of aluminum alloys were investigated: (1) I/M 2XXX containing Li and I/M 2XXX without Li, (2) I/M 6XXX, (3) two P/M 2XXX alloys, and (4) two different aluminum-based metal matrix composites (MMC). The I/M alloys were targeted for a Mach 2.0 aircraft and the P/M and MMC alloys were targeted for a Mach 2.4 aircraft. Design studies were conducted using several different concepts including skin/stiffener (baseline), honeycomb sandwich, integrally stiffened and hybrid adaptations (conventionally stiffened thin-sandwich skins). Alloy development included fundamental studies of coarsening behavior, the effect of stress on nucleation and growth of precipitates, and fracture toughness as a function of temperature were an integral part of this program. The details of all phases of the research are described in this final report.

Author

Aircraft Structures; Aluminum Alloys; Metal Matrix Composites; Composite Structures; Civil Aviation

19980013934 California Univ., Materials Dept., Santa Barbara, CA USA

De-sintering, A Phenomena Concurrent with Densification Within Powder Compacts: A Review

Lange, F. F., California Univ., USA; Jan. 1994; 12p; In English

Contract(s)/Grant(s): AF-AFOSR-0125-91

Report No.(s): AD-A332713; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A morphological instability characterized by the separation of grain pairs and the disappearance of grain boundaries is a common feature in polycrystalline bodies that are constrained from shrinking during mass transport. This instability, known as de-sintering, occurs during grain coarsening as sequentially observed for thin films with columnar microstructures constrained by a substrate, fibers with a 'bamboo' microstructure constrained by a matrix, and powder matrices within composites. De-sintering is a common phenomena in partially dense, polycrystalline bodies; it occurs concurrently with densification phenomena and is emphasized in composites where the partially dense matrix is constrained from shrinking by a reinforcement network. De-sintering occurs in any lower density region where shrinkage is constrained by the average shrinkage of the body.

DTIC

Powder Metallurgy; Densification; Morphology; Microstructure

19980013935 Lord Corp., Cary, NC USA

Adhesion Promotion and Corrosion Prevention from Coatings Based on Sol-Gel Technology

Yanyo, Lynn C., Lord Corp., USA; Jun. 1994; 14p; In English; Tri-Service Committee on Corrosion, 21-23 Jun. 1994, Orlando, FL, USA

Report No.(s): AD-A330959; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Using a unique form of sol-gel technology, thin organic/ceramic (ceramer) coatings have been applied to metal surfaces to enhance such surface properties as adhesion promotion and corrosion prevention. Isotropic coatings derived from tetraethoxysilane, for example, have been found to effectively inhibit corrosion while being only 100-1000 Å thick. The formation of anisotropic (functionally gradient) coatings permits greater flexibility over the resulting properties. Using combinations of monomers

with appropriate reactivities permits the single-step synthesis of anisotropic coatings that can both promote adhesion and prevent corrosion.

DTIC

Sol-Gel Processes; Adhesion; Anisotropy; Ceramic Coatings; Corrosion Prevention

19980013936 Naval Air Warfare Center, Aircraft Div., Warminster, PA USA

A Comparison of Alternatives to Chromic Acid Anodizing, Tri-Service Committee on Corrosion Proceedings Held in Orlando, Florida on June 21-23 1994

Spadafora, Stephen J., Naval Air Warfare Center, USA; Pepe, Frank R., Naval Air Warfare Center, USA; Jun. 1994; 14p

Report No.(s): AD-A330952; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Chromic acid anodizing (CAA) is an aluminum surface pretreatment currently used on military aircraft and equipment. Chromium VI, present in this process, is a carcinogen and federal, state and local environmental agencies have implemented legislation which restricts the use of this material. The Naval Air Warfare Center Aircraft Division Warminster investigated several alternatives to CAA including: Sulfuric-Boric Acid Anodize, Sulfuric Acid Anodizing, and Phosphoric Acid Anodizing. Physical performance properties of these processes were characterized and as a result of this program, the MIL-A-8625 anodize specification was modified to include some of these alternatives.

DTIC

Chromic Acid; Chromium; Conferences; Corrosion; Metal Surfaces; Phosphoric Acid; Pretreatment; Sulfuric Acid

19980013937 National Inst. of Standards and Technology, Materials Science and Engineering Lab., Gaithersburg, MD USA

Evaluation of the Corrosion Behavior of Storage Container Alloys in Halon 1301 Replacement Candidate Agents

Dante, J. F., National Inst. of Standards and Technology, USA; Stoudt, M. R., National Inst. of Standards and Technology, USA; Fink, J. L., National Inst. of Standards and Technology, USA; Beauchamp, C. R., National Inst. of Standards and Technology, USA; Moffat, T. P., National Inst. of Standards and Technology, USA; Jun. 1994; 14p; In English; Tri-Service Conference on Corrosion Proceedings, 21-23 Jun. 1994, Orlando, FL, USA

Report No.(s): AD-A330951; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Montreal Protocol of 1987 identified a number of halogenated chemicals which possess sufficient stratospheric ozone depletion potentials to warrant limitations on their production and use. Included on this list was Halon 1301 (CF₃Br), the fire suppression agent of choice for aircraft engine nacelles and dry bays (1). As a result, the relative performance of different chemical compounds with low ozone depletion potentials were evaluated as a CF₃Br fire suppressant replacement. Since corrosion of fire suppressant containers by the agent could affect the reliability of these vessels, the corrosion behavior of typical alloys used in these containers needed to be evaluated. Mass change tests were performed for 1 month in different agents at 150 deg C. Electrochemical tests were desired to supplement and possibly replace the current mass change experiments. A major advantage of electrochemical testing is the significant reduction in time required to estimate corrosion rates and the effect that pollutants (HF, HCl, and H₂O) in various agents, compositional changes, and the temperature have on the corrosion rate.

DTIC

Atmospheric Composition; Chemical Composition; Contaminants; Corrosion; Fires; Hydrochloric Acid

19980013938 Naval Surface Warfare Center, Annapolis, MD USA

Corrosion Consequences of Molten Salt Deposits in Combustion Turbines Burning Vanadium Contaminated Liquid Fuel

Rathnamma, Dasara V., Naval Surface Warfare Center, USA; Nagarajan, R., InterNational Business Machines Corp., USA; Jun. 1994; 36p; In English; Tri-Service Conference on Corrosion Proceedings, 21-23 Jun. 1994, Orlando, FL, USA

Report No.(s): AD-A330947; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Molten salts condensing on marine turbine blades can dissolve the protective oxide coating and catastrophically attack the exposed alloy surface beneath-- a process known as hot corrosion. We present here the implications of a theoretical model of hot corrosion rate that is limited by diffusional dissolution of oxide species into the melt for the design of burner-rigs to test the corrosion-resistance of superalloy materials. Parameters expected to govern the dissolution rate of a given oxide are the rate of deposition of the multicomponent(sulfate-vanadate-oxide)'solvent'- liquid, liquid-layer thickness, and composition-dependent physical properties of the deposit, such as density and viscosity. The solid portion of deposit mass, being relatively inert with respect to hot corrosion, will not correlate well with experimental corrosion rates. These hypotheses are tested by comparing our model-predictions with one set of burner-rig corrosion rate measurements made during the combustion of vanadium-containing liquid fuel seeded with the same concentration of various metallic additives. Our findings indicate that the total weight (solids + liquid) of the deposit has no direct correspondence with its corrosive potential. However, additives that are effective in suppressing liquid phase formation will, in general, reduce the corrosion rate equally effectively. Liquid mass arrival rate and oxide solubility in the

liquid are quantities of relevance to the problem, but the best correlation of experimental data with theory is obtained for the oxide dissolution rate (which is approximately inversely proportional to the liquid layer thickness). Thus, burner-rigs designed to simulate either of these two parameters will reproduce the hot-corrosion characteristics of the engine with reasonable accuracy.

DTIC

Burners; Combustion; Condensing; Contamination; Corrosion; Corrosion Resistance; Data Correlation; Gas Turbine Engines; Heat Resistant Alloys; Hot Corrosion; Hypotheses

19980014090 National Inst. of Standards and Technology, Building and Fire Research Lab., Gaithersburg, MD USA

Required Properties of High-Performance Steels

Galambos, T. V., Minnesota Univ., USA; Hajjar, J. F., Minnesota Univ., USA; Earls, C. J., Minnesota Univ., USA; Gross, John L., National Inst. of Standards and Technology, USA; May 1997; 101p; In English

Contract(s)/Grant(s): NIST-5D0142

Report No.(s): PB97-167381; NISTIR-6004; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This report presents the results of a study of high-performance steels with yield stress values between 480 MPa and 690 MPa (70 ksi and 100 ksi). These materials are a new family of constructional steels. The impetus for the study was the need for the determination of the applicability of these steels for use with current structural design specifications for buildings and bridges. The following sources were considered in the study: the technical and scientific literature on the development of the current design requirements; discussion from a workshop on the topic of the new materials; and numerical studies performed for this project. The main conclusion from this investigation is that the use of high-performance steels for civil engineering structural applications is feasible, but that considerable data obtainable from steel mills and from further research, combined with technical and economic studies, are needed.

NTIS

Specifications; High Strength Steels; Buildings; Bridges (Structures); Construction

19980014220 NERAC, Inc., Tolland, CT USA

Casting Defects in Foundry Products (Latest Citations from METADEX)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-862594; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the identification and correction of defects and surface abnormalities in foundry castings. Topics discuss methods used to detect casting flaws including ultrasonic testing, mold filling simulation, and simplified marker and cell method (SMAC). Also reviewed are the parameters and procedures for correcting casting flaws. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Castings; Foundries; Defects

19980014222 NERAC, Inc., Tolland, CT USA

Ladle and Vacuum Refining of Nonferrous Metals. (Latest Citations from METADEX)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-862834; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning equipment and techniques for the refining of nonferrous alloys. Vacuum degassing; high-speed inert gas injection; and the use of chemical additives for the removal of dissolved oxygen, hydrogen, and unwanted elements, are discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Nonferrous Metals; Refining

19980014443 Vanderbilt Univ., Nashville, TN USA

The Use of Superconducting Magnetometry to Detect Corrosion in Aircraft Alloys

Li, De-Lin, Vanderbilt Univ., USA; Ma, Yupei, Vanderbilt Univ., USA; Flanagan, W. F., Vanderbilt Univ., USA; Lichter, B. D., Vanderbilt Univ., USA; Wikswo, J. P., Jr., Vanderbilt Univ., USA; Jun. 1994; 14p; In English; Tri-Service Conference on Corrosion, 21-23 Jun. 1994, Orlando, FL, USA

Contract(s)/Grant(s): F49620-93-D-0268

Report No.(s): AD-A330961; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The magnetic field distribution for three different types of in-situ corrosion has been measured using SQUID magnetometry. The variations of the magnetic field density with time differ for the three types of corrosion. The higher the corrosion rate, the more intense is the magnetic field. The SQUID magnetometer is also shown to be sensitive to corrosion activity occurring on the opposite side of a plate specimen.

DTIC

Magnetic Field Configurations; Magnetic Fields; Magnetic Measurement; Magnetometers

19980014454 China Nuclear Information Centre, Beijing, China

The study of high-boron steel and high-boron cast iron used for shield

Pan, Xuerong, Nuclear Power Inst. of China, China; Lu, Jixin, Nuclear Power Inst. of China, China; Wen, Yaozeng, Nuclear Power Inst. of China, China; Wang, Zhaishu, Nuclear Power Inst. of China, China; Cheng, Jiantin, Nuclear Power Inst. of China, China; Cheng, Wen, Nuclear Power Inst. of China, China; Shun, Danqi, Nuclear Power Inst. of China, China; Yu, Jinmu, Nuclear Power Inst. of China, China; Dec. 1996; 12p; In Chinese

Report No.(s): CNIC-01123; SINRE-0074; DE97-632348; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)); US Sales Only, Microfiche

The smelting, forging, heat-treatment technology and the mechanical properties of three kinds of high-boron steels (type 1: 0.5% boron; type 2: 0.5% boron and 4% or 2% nickel; type 3: 0.5% boron, 0.5% nickel and 0.5% molybdenum) were studied. The test results show that the technology for smelting, forging and heat-treatment (1050 degree C/0.5 h water cooled + 810 degree C/1 h oil cooled) in laboratory is feasible. Being sensitive to notch, the impact toughness of high-boron steel type 1 is not steady and can not meet the technology requirements on mechanical properties. The mechanical properties of both high-boron steel type 2 and type 3 can meet the technological requirements. The smelting technology of high-boron casting iron containing 0.5% boron was researched. The tests show that this casting iron can be smelted in laboratory and its properties can basically satisfy the technology requirements.

DOE

Steels; Boron; Cast Alloys; Iron Alloys

19980014811 Minnesota Univ., Minneapolis, MN USA

Analysis, Design, and Computation of Active Materials Final Report, 1 Apr. - 30 Sep. 1996

James, Richard, Minnesota Univ., USA; Luskin, Mitchell, Minnesota Univ., USA; Mar. 13, 1997; 5p; In English
Contract(s)/Grant(s): F49620-96-I-0057

Report No.(s): AD-A330636; AFOSR-TR-97-0319; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The research reported here concerns the mathematical modeling and numerical simulation of the behavior of active materials, especially shape memory and magnetostrictive materials. New theories for thin films of active material were derived using change-of-scale calculations. These were used as the basis of several new design concepts for microactuators. Work continued on the modeling of a new class of active materials, magneto-memory materials, whose existence was predicted under previous AFOSR support. Guided by a new theory of magnetostriction, a search has led to the first of these materials during the past year. This material currently exhibits the largest magnetostrictive effect known. New numerical methods were developed and analyzed for the computation of materials with microstructure. These methods were used to compute the complex microstructure that is observed when a laminate of two phases meets a homogeneous phase.

DTIC

Magnetostriction; Microstructure; Numerical Analysis

19980014812 Naval Air Warfare Center, Aircraft Div., Warminster, PA USA

Tri-Service Committee on Corrosion

Pulley, David, Naval Air Warfare Center, USA; Jun. 1994; 8p; Proceedings: Revision of Navy Paint Specifications, 21-23 Jun. 1994, Orlando, FL, USA

Report No.(s): AD-A330966; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The Navy maintains a number of specifications for the organic coatings applied to aircraft and ground support equipment. These documents are periodically revised and amended to include lessons learned from qualification testing, improvements in the state-of-the-art, and new regulatory requirements. To accomplish these objectives, we will revise ten different specifications by the end of this year. They include: wash primer alkyd primer, epoxy primers, polyurethane primer, acrylic lacquer, temporary, acrylic lacquer, epoxy topcoat, polyurethane topcoat, polyurethane, rain-erosion coating. All of these specifications (including every type and class) will comply with air-pollution regulations that limit the Volatile Organic Compounds (VOC) content. This will be accomplished using water-borne or high-solids coatings technology. The maximum VOC Content will generally be set at

340 grams/liter for primers and 340-420 grams/liter for other coatings. The use of 1,1,1-trichloroethane (exempt from VOC regulations) will no longer be permitted due to its classification as an ozone-depleting substance.

DTIC

Organic Compounds; Protective Coatings; Organic Materials; Polyurethane Resins; Aircraft Design; Paints

19980015201 NERAC, Inc., Tolland, CT USA

Passivation of Metal: Mechanisms and Analysis. (Latest Citations from METADEX)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864616; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the applications, analyses, and mechanisms of passivating films, coatings, and surface treatments of metal substrates. The study of passive films by auger electron spectroscopy, glow discharge spectroscopy, and other methods are discussed. The passivation of ferrous and nonferrous metals by electrochemical deposition, chemical coating, surface alloying and mechanical coating is included.

NTIS

Bibliographies; Passivity; Metals; Surface Treatment; Coatings

19980015206 Purdue Univ., School of Aeronautics and Astronautics, West Lafayette, IN USA

A Fracture Mechanics Based Approach for Quantifying Corrosion Damage

Doerfler, Mark T., Purdue Univ., USA; Grandt, Alten F., Jr., Purdue Univ., USA; Bucci, Robert J., Aluminum Co. of America, USA; Jun. 1994; 14p; In English; Tri-Service Committee on Corrosion, 21-23 Jun. 1994, Orlando, FL, USA

Report No.(s): AD-A331053; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A fracture mechanics based approach to quantify the influence of initial corrosion damage on structural integrity is described. This approach assumes that corrosion can be approximated by a geometric structural change consisting of a general thickness reduction combined with a localized stress concentration. These two parameters enable quantification of the damage and the application of fracture mechanics principles to corrosion. Several numerical examples of this concept are discussed and a test program, combined with inspection capabilities, is introduced.

DTIC

Corrosion; Fracture Mechanics; Stress Concentration; Structural Failure

19980015223 NERAC, Inc., Tolland, CT USA

Electroplating of Chromium . (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864517; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the technology and evaluation of protective and wear-resistant electroplating of chromium. Chemical and thermal stable platings for use in solar absorbers are examined. Citations also discuss high-purity chromium, thermal aging and degradation of electroplated chromium, automated plating process for gun barrels and cannon tubes, electrowinning, and effluent treatment.

NTIS

Bibliographies; Electroplating; Chromium Alloys; Technologies; Evaluation; Protective Coatings

19980015337 Rosenblatt (M.) and Son, Inc., Arlington, VA USA

Corrosion Control of Inter-Hull Spaces Final Report

Kikuta, M., Rosenblatt (M.) and Son, Inc., USA; Shimko, M., Rosenblatt (M.) and Son, Inc., USA; Ciscen, D., Rosenblatt (M.) and Son, Inc., USA; Jan. 1996; 118p; In English

Report No.(s): PB96-167580; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The report expands upon the work conducted by the Naval Sea Systems Command to develop a tank preservation protocol which is intended to achieve a service life of 15 to 20 years. This report focuses on controlling corrosion in the region between the inner and outer hulls in new double hull designs. Information was obtained from classification societies; U.S., European, and Japanese shipyards; coating manufacturers; maritime magazine articles; reports; and the U.S. Navy to determine the current maintenance and repair practices for inter-hull spaces. This information was assimilated and organized into a recommended inter-hull

space preservation protocol. The protocol unified individual 'good painting practice' inputs from the various references into a process which is expected to provide 20 years of corrosion protection to the inter-hull space.

NTIS

Tanker Ships; Ship Hulls; Corrosion Resistance; Corrosion Prevention; Tanks (Containers); Planning; Technologies; Procedures

19980015347 NERAC, Inc., Tolland, CT USA

Corrosion Resistance of Nickel and Nickel Alloys. (Latest citations from Information Services in Mechanical Engineering Database)

Jan. 1996; In English

Report No.(s): PB96-859368; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the corrosion resistance of nickel and nickel alloys used in electrical and structural materials and chemical processes. Topics include susceptibility of nickel to high temperature sulfidation, normal exposure to saline and other high chloride environments, pitting corrosion, and metal coatings. Special cases of corrosion of weld-filler metal combinations are also included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Nickel; Nickel Alloys; Corrosion Resistance

19980015377 Swedish Inst. for Metals Research, Stockholm, Sweden

Simulation of Residual Stresses After Quenching of Ring in Compound Materials: Comparison between Heat Treatment Simulation Codes and Test of Material Database Interface

Thuvander, A., Swedish Inst. for Metals Research, Sweden; Mar. 07, 1996; 16p; In English

Report No.(s): PB96-172846; SER-D-746; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Quenching of a compound ring was simulated numerically. Two different simulation codes, DistSIMR and Trast7, were used. The material data were taken from a recently developed database. The database has an interface which can produce input data adjusted to the formats of the two codes. The same original data were used for both simulations although converted to the appropriate formats. The resulting residual stresses were compared. The ring selected for the simulation consists of two materials, an inner part of high speed steel ASP 2060 and an outer part of tool steel K326. The heat treatment simulated was salt bath quenching in 540 degrees C followed by air cooling. Typical values of heat transfer coefficients were used. The results of the simulations showed good agreement between the two models. Since the two models were developed individually this is an indication that the models produce reliable results provided that correct input data are used.

NTIS

Steels; Heat Treatment; Computerized Simulation; Simulation; Residual Stress

19980015409 NERAC, Inc., Tolland, CT USA

Aluminum and Aluminum Alloy Castings. (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864046; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, development, analysis, and evaluation of aluminum and aluminum alloy castings. Topics include evaluations of casting techniques, studies of structure and properties of cast aluminum alloys, heat-resistant and high strength cast aluminum alloys, and investigations of casting flaws and defects. Aerospace and military applications are presented. Research reports of CAST (Cast Aluminum Structures Technology) are included.

NTIS

Bibliographies; Design Analysis; Product Development; Evaluation; Aluminum Alloys

19980015429 Ocean City Research Corp., Alexandria, VA USA

Evaluation of Environmentally Acceptable Multi-Layer Coating Systems as Direct Substitutes for Cadmium Plating on Threaded Fasteners

Ingle, Mark W., Ocean City Research Corp., USA; Handsy, I. C., Army Tank-Automotive Command, USA; Jun. 1994; 21p; In English; Tri-Service Committee on Corrosion, 21-23 Jun. 1994, Orlando, FL, USA

Report No.(s): AD-A330958; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Cadmium has been identified by the USA Army's Tank and Automotive Command as a threat to worker health and the environment. Based on already completed cadmium substitute testing, an evaluation program was conducted to quantify the perfor-

mance of environmentally acceptable, multi-layer coatings that could be directly substituted for cadmium on threaded fasteners. The performance issues investigated included coating system lubricity and corrosion control performance. Data were generated from both natural marine atmosphere exposure tests and laboratory evaluations. Test specimens were prepared by applying sacrificial plating layers and lubricous topcoat materials to commercially available 1/2-20 UNC Fine, Grade 5 fasteners. Experimental analyses included realistic torque-tension curve development, marine atmosphere exposure testing, and ASTM B 117 salt fog evaluations. Program findings indicate that ASTM B 633 zinc coatings (without the Type 2 or 3 chromate passivation treatment) exhibited torque tension behavior that was directly comparable to that of the cadmium experimental controls. Corrosion control performance test results indicated that regardless of underlying plating chemistry, systems topcoated with Everlube 6108 performed as well as the cadmium experimental controls.

DTIC

Coatings; Environment Protection; Performance Tests

19980015430 Army Research Lab., Materials Directorate, Watertown, MA USA

Evaluation of Environmentally Acceptable Protection Schemes for High Strength Steel Fasteners

Placzankis, Brian, Army Research Lab., USA; Levy, Milton, Army Research Lab., USA; Beatty, J., Army Research Lab., USA; Isserow, S., Army Research Lab., USA; Kane, K., Army Research Lab., USA; Jun. 1994; 29p; In English; Tri-Service Committee on Corrosion Proceeding, 21-23 Jun. 1994, Orlando, FL, USA

Report No.(s): AD-A331007; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Initial corrosion testing was done by ARL Materials Directorate in 1991 in a TACOM (Tank/Automotive Command) sponsored study to determine the effects of substituting Zinc or various other coating systems in the place of electroplated Cadmium. In addition to test assemblies utilizing a single coating, mixed assemblies comprised of various coated bolts and Cadmium coated washers/nuts were evaluated. The results were published in a technical report (MTL TR 92-40),¹ which contains complete corrosion data and photographic documentation of the corrosion observed throughout the test program for Cd, Zn-Ni, Zn OD (Olive Drab finish), Zn-Co, Sn-Zn, and modified phosphate coatings. This paper will summarize these results, and add data for IVD Al. Three types of IVD Al are compared against the Cadmium and Zn-Ni plating.

DTIC

Coatings; Corrosion Tests

19980015443 Swedish Inst. for Metals Research, Stockholm, Sweden

Material Property Database for Heat Treatment Simulation of Compound Materials

Thuvander, A., Swedish Inst. for Metals Research, Sweden; Blom, R., Swedish Inst. for Metals Research, Sweden; Jin, L. Z., Swedish Inst. for Metals Research, Sweden; Feb. 08, 1996; 51p; In English

Report No.(s): PB96-172838; SER-D-744; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Material properties of compound materials have been determined for use in numerical simulation of heat treatment. A database has been built in which the data have been entered. The database will be used for input data generation in simulations in order to predict stresses and distortion. For that purpose an interface to heat treatment simulation programs was constructed which allows quick selection of data. Data can be selected from the database for any combination of materials. The materials investigated were all produced with powder metallurgy and with good high temperature properties. They include the high speed steels ASP 2060 and TEM 60, another tool material CORONITE, a 12% chromium stainless steel ASP 2317, and the steel APM 2220. Data previously determined for the high speed steel ASP 2023, and the hot work tool steel K236 were also entered in the database.

NTIS

Stainless Steels; Heat Treatment; Computerized Simulation; Data Bases

19980015751 Kansas Univ., Center for Research, Inc., Lawrence, KS USA

Corrosion-Resistant Steel Reinforcing Bars Final Report

Darwin, D., Kansas Univ., USA; May 31, 1995; 27p; In English

Report No.(s): PB96-147988; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This study evaluated the corrosion resistance and mechanical properties of steel rebars, Produced by new microalloying and rolling procedures, that exhibit superior corrosion resistance properties. Tests results (corrosion potential and time-to-corrosion) showed that microalloying decreased the corrosion rate by one-half as compared to conventional steel. Quenching and tempering heat treatment of steel in conjunction with microalloying further enhanced its corrosion resistance. The heat treatment also improved the yield and tensile strengths of the steel. The test results also showed that a phosphorus content in excess of that allowed

under current ASTM requirements did not cause the corrosion resistant steel to be brittle. The new steel also performed well when used in conjunction with epoxy coating. Recommendations on the use of this steel as concrete reinforcement have been provided.
NTIS

Maintenance; Concrete Structures; Corrosion Resistance; Evaluation; Mechanical Properties; Reinforcement (Structures); Steels; Highways

19980016141 Virginia Transportation Research Council, Charlottesville, VA USA

Investigation of New Inhibitors to Mitigate Rebar Corrosion in Concrete *Final Report*

Taylor, S. R., Virginia Transportation Research Council, USA; Mason, S. E., Virginia Transportation Research Council, USA; Cella, P. A., Virginia Transportation Research Council, USA; Clemena, G. G., Virginia Transportation Research Council, USA; Apr. 1996; 36p; In English

Report No.(s): PB96-176276; VTRC-96-R24; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Rebar corrosion in concrete is the most costly and performance-limiting problem facing the nation's infrastructure. One of the most practical and economical approaches to this problem is to use corrosion inhibitors in a quality concrete mix for new construction. This investigation examined the corrosion inhibition characteristics of a series of compounds in a simulated pore solution (SPS), saturated calcium hydroxide, using rebar samples. The compounds were selected based on qualities of either low water solubility, good performance in alkaline environments, or promising results in the literature.

NTIS

Corrosion Prevention; Concretes; Inhibitors; Reinforcement (Structures)

19980016305 NERAC, Inc., Tolland, CT USA

Corrosion Prevention in Saline Environments. (Latest Citations from METADEX)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863790; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning protection from galvanic corrosion in saline environments. Electrochemical techniques and testing methods are described for large steel structures, steel pilings, underground installations, and pipes exposed to soils saturated with salt water. Additional topics include protection of ship hulls and propellers. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Corrosion Prevention; Electrochemical Corrosion; Salinity

19980016657 National Inst. of Standards and Technology, Boulder, CO USA

Low-Temperature Properties of Silver

Smith, D. R., National Inst. of Standards and Technology, USA; Fickett, F. R., National Inst. of Standards and Technology, USA; Journal of Research of the National Inst. of Standards and Technology; 1995; Volume 100, No. 2, pp. 119-171; In English

Report No.(s): PB96-126198; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Pure silver is used extensively in the preparation of high-temperature superconductor wires, tapes, films, and other configurations in which the silver not only shields the superconducting material from the surrounding materials, but also provides a degree of flexibility and strain relief, as well as stabilization and low-resistance electrical contact. Silver is relatively expensive, but at this stage of superconductor development, its unique combination of properties seems to offer the only reasonable means of achieving usable lengths of conductor. In this role, the low-temperature physical (electrical, thermal, magnetic, optical) and mechanical properties of the silver all become important. Here the authors present a collection of properties data extracted from the cryogenic literature and, to the extent possible, selected for reliability.

NTIS

High Temperature Superconductors; Mechanical Properties; Optical Properties; Silver; Superconducting Films; Superconductors (Materials); Wire

19980016662 Swedish Inst. for Metals Research, Stockholm, Sweden

Modelling of Precipitate and Austenite Evolution during Hot Working of Nb-Microalloyed Steels

Siwecki, T., Swedish Inst. for Metals Research, Sweden; Wiese, H., Swedish Inst. for Metals Research, Sweden; Jan. 1995; 69p; In English

Report No.(s): PB96-126529; IM-3210; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The computer model for prediction of the precipitation behavior during thermomechanical control processes has been developed, in order to control the precipitation during and after processing. The proposed model is based on the classical nucleation theory and the kinetics of growth controlled by diffusion of Nb. The routine requires input of steel chemistry and a starting grain size after austenitization together with temperature, strain and the constants for precipitate nucleation rate. The precipitation behavior of Nb(C,N) in deformed and undeformed austenite as well as static recrystallization characteristics in the 0.03%Nb-(Ti)-N-microalloyed steels have been determined on the base of systematic experimental investigations. These have been compared with the computer routine calculation of strain induced Nb(C,N) precipitate and austenite (recrystallization) evolution.

NTIS

Computerized Simulation; Deformation; Kinetics; Mathematical Models; Nucleation; Precipitates; Recrystallization; Static Characteristics; Thermodynamics

19980016665 Technische Univ., Delft, Netherlands

Decomposition of Iron-Based Martensites: Redistribution of Interstitial Atoms and Precipitation

vanGenderen, M. J., Technische Univ., Netherlands; Oct. 09, 1995; 206p; In English

Report No.(s): PB96-127881; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

This thesis deals with the decomposition behavior of various iron-based interstitial martensites during heat treatments. These heat treatments lead to a series of phase transformations including preprecipitation (clustering/ordering), the formation of transition precipitates and the formation of equilibrium precipitates. Binary FeC and FeN martensites are used as model systems to study the effect of the nature of the interstitial atoms on the (pre)precipitation behavior. Diffraction experiments using high-intensity synchrotron radiation revealed clear differences in the precipitation behavior of FeC and FeN at room temperature (RT).

NTIS

Martensite; Phase Transformations; Precipitates; Room Temperature; Synchrotron Radiation

19980016701 NERAC, Inc., Tolland, CT USA

Shape Memory Alloys: Medical and Dental Applications. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-856075; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning uses and innovations for Nitinol and martensitic phase/temperature transformation alloys. The citations describe applications in surgical devices and implants, eyeglasses, and orthodontia corrective wire. Patents are included for actuators, resetting methods, intravenous tubes, dental polishers, kidney stone instruments, and temperature sensing devices. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Shape Memory Alloys; Medical Equipment; Dentistry

19980016801 Bureau of Mines, Reno Research Center, Reno, NV USA

Electrochemical Reduction of Titanium in Nonaqueous Solvents

Sibrell, P. L., Bureau of Mines, USA; 1995; 30p; In English

Report No.(s): PB96-131297; BUMINES-RI-9592; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Electrorefining of Ti in nonaqueous solvents has been studied by the U.S. Bureau of Mines as a method for recycling impure scrap Ti. Electrochemical behavior of Ti species was investigated using cyclic voltammetry. Research results showed that Ti metal can be dissolved in polar solvents such as dimethylformamide or dimethyl sulfoxide. However, deposition of Ti from these solvents was not successful. Several solvent systems were investigated for electrodeposition of Ti but no deposits were obtained. Reduction of Ti(4+) complexes to Ti(3+) proved to be straightforward, but reduction to lower oxidation states could not be confirmed. Therefore, the prospects for a nonaqueous electrorefining system for Ti metal do not appear promising.

NTIS

Electrochemistry; Titanium; Recycling; Scrap

19980016877 University of South Florida, Dept. of Civil and Environmental Engineering, Tampa, FL USA

Performance of Alternative Material Rebar Final Report, Sep. 1992 - Jun. 1995

Moreno, Eric I., University of South Florida, USA; Saguees, Alberto A., University of South Florida, USA; May 1996; 46p; In English

Report No.(s): PB96-181094; FL/DOT/RMC/0647-4482; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The pH of the concrete pore solution is expected to be somewhat lower in concretes using pozzolanic additions than in concrete using unblended cements. Previous research has shown that variations in pH pore solution may be the cause of conflicting reports on the performance of galvanized rebar. To examine that factor, plain and galvanized rebars have been tested for over two years in concrete specimens made with cement type 2, with various contents of fly ash and silica fume. Electrochemical impedance measurements and sensitive polarization techniques have been used to measure the rate of metal dissolution in the absence of chloride contamination at two different levels of concrete moisture.

NTIS

Reinforcing Materials; Steels; Impedance Measurement; Chlorides

19980016901 United Technologies Research Center, East Hartford, CT USA

Evaluation of Structural Porous Metals Final Report, 11 Oct. 1995 - 10 Oct. 1997

Thompson, Mark S., United Technologies Research Center, USA; Renauld, Mark L., United Technologies Research Center, USA; Dec. 10, 1997; 54p; In English

Contract(s)/Grant(s): N00014-95-C-0231

Report No.(s): AD-A333432; R97-5.903.0008-9; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Porous metals possess a number of attractive property attributes that may enhance current system capabilities. These include mechanical properties, energy absorption properties, acoustic attributes and thermal properties. There is continuing work to evaluate key performance characteristics such as corrosion resistance and fatigue behavior. In this program, two new commercial products are studied, aluminum alloy foam from Austrian Metal Company (AMAG) and aluminum (A356) and nickel (Hastelloy-X) alloy Lattice Block Material (LBM(TM)) from JAMCORP. These materials were evaluated for their macrostructural features, microstructural characteristics and mechanical performance. The aluminum foam, equivalent to 6061 aluminum alloy, was fabricated in both plate and cylindrical forms at two densities ranges. All product forms exhibit variation in macrostructure which causes significant variation in the measured compression, tension and bending properties. In general, the experimental data compare well with the models of Gibson & Ashby. In contrast, the LBM(TM) product shows an extremely repeatable structure which leads to superior compression and bending properties coupled with reduced data scatter. Using bulk parent metal stress-strain properties, finite element model predictions correlate well with experimental findings. Additional prediction are made for the effect of unit cell size, ligament diameter and parent metal strength on the performance of LBM(TM).

DTIC

Evaluation; Porous Materials; Dynamic Structural Analysis; Composite Materials

27

NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see 24 Composite Materials.

19980012494 Environmental Protection Agency, Research Triangle Park, NC USA

Architectural Coatings: Background for Proposed Standards. Draft

Mar. 1996; 89p; In English

Report No.(s): PB96-192513; EPA/453/R-95/009A; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The document contains background information for the proposed National volatile organic compounds (VOC) standard for architectural coatings. It contains a description of the architectural coatings category, an industry profile, information on emission control techniques, and a discussion of the calculation methodology to determine VOC emission reductions.

NTIS

Protective Coatings; Paints; Tests; Organic Compounds; Control Systems Design; Air Sampling

19980012505 NERAC, Inc., Tolland, CT USA

Advanced Ceramic Materials Technology. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English; Page count unavailable.

Report No.(s): PB96-858980; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the processing and evaluation of advanced ceramics. Processing includes melting, sintering, casting, and synthesis of advanced ceramics. Evaluations of green, sintered, and manufactured components

relate to evaluation techniques and results pertaining to density, porosity, strength, defects, wear, and high temperature mechanical properties. Advanced ceramics applications include heat engines, electronics, integrated optics, structural components, sensors, and cutting tools.

NTIS

Bibliographies; Ceramics; Technologies; Evaluation

19980012521 Bureau of Reclamation, Materials Engineering and Research Lab. Group, Denver, CO USA

Freeze-Thaw Cycling and Cold Temperature Effects on Geomembrane Sheets and Seams *Final Report*

Comer, A. I., Bureau of Reclamation, USA; Mar. 1996; 142p; In English

Report No.(s): PB96-177175; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The Bureau of Reclamation and the U.S. Environmental Protection Agency sponsored this study of the effect of cold temperature and freeze-thaw cycles on geomembranes used as seepage barriers in water storage and transport and waste containment. Part 1 involved incubating unconfined specimens in freeze-thaw cycles and performing tests at +20 deg C. Part 2 involved the same incubating condition as Part I, but tests were performed at 20 deg C. In Part 3, specimens were confined during freeze-thaw cycles and tested at +20 deg C. part IV monitored stress relaxation behavior and cold temperature induced stress between +30 deg C and -20 deg C.

NTIS

Confinement; Containment; Stress Relaxation; Temperature Effects; Water

19980012532 Northwestern Univ., Evanston, IL USA

AASERT94 Processing and Characterization Knowledge Base for Device-Compatible Second-Order Nonlinear Optical Polymers *Final Report, 1 Jul. 1994 - 30 Jun. 1997*

Marks, T. J., Northwestern Univ., USA; Wong, G. K., Northwestern Univ., USA; Nov. 20, 1997; 21p; In English

Contract(s)/Grant(s): F49620-94-1-0354; AF Proj. 2303

Report No.(s): AD-A332823; AFOSR-TR-97-0723; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This project consists of a collaborative synthetic, processing, physical characterization, and theoretical program aimed at the rational design, construction, evaluation, and fundamental understanding of new types of maximum-performance molecule/polymer-based materials exhibiting high second-order ($x(\exp 2)$) optical nonlinearities. Areas of emphasis include poled chromophore-functionalized glassy polymers, poled chromophore-embedded crosslinkable matrices, chromophoric self-assembled superlattices, the theoretical design and analysis of novel chromophores and chromophore environments, theoretical studies of poling dynamics, studies of optical damage phenomena, and fabrication of new types of NLO waveguides.

DTIC

Nonlinear Optics; Optical Materials

19980012614 Battelle Columbus Labs., OH USA

Effect of Pipe Wall Thickness on the Heat Fusion Quality of Polyethylene Saddle Joints. *Task Report, Jan. - Jul. 1992*

Pimputkar, S. M., Battelle Columbus Labs., USA; Stets, J. A., Battelle Columbus Labs., USA; Jul. 1995; 36p; In English

Report No.(s): PB96-183009; GRI-95/0226; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Identical saddle fittings are used on polyethylene gas distribution pipe of the same diameter but different wall thickness. The objective of this study was to determine the effect of pipe wall thickness on saddle fusion integrity. Several saddle joints were made at the manufacturers' recommended conditions, while only the wall thickness was varied. When making most of the joints, thermocouples were used to determine the temperatures at 10 saddle and pipe locations during heating. The saddle joints were also cut into test specimens and subjected to shear impact testing in order to determine the strength of the joints. There was no measurable effect of pipe wall thickness on saddle fusion quality (defined by the average shear impact energy of each joint).

NTIS

Saddles (Supports); Joints (Junctions); Walls; Thickness; Gas Pipes

19980012762 NERAC, Inc., Tolland, CT USA

Intumescent Materials. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Jan. 1996; In English

Report No.(s): PB96-859863; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning the composition and use of intumescent materials for fire protection. Patents discuss coatings, seals, enclosures, protective coverings and sheaths, self-extinguishing compositions, and

fire-stop couplings. Citations also describe applications in electrical outlets, sheeting and paneling materials, power and communication cables, and gasketing. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Fire Prevention; Protection

19980013045 British Gas Corp., Gas Research and Technology Centre, Loughborough, UK

Evaluation of Coating Condition Using the Elastic Wave Pig Final Report, Jun. 1995 - Apr. 1996

Stirling, D. G., British Gas Corp., UK; Mar. 1997; 35p; In English

Contract(s)/Grant(s): GRI-97/0073

Report No.(s): PB97-177018; GRTC/P267; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Elastic Wave vehicle has a proven record in detecting longitudinal cracks in steel pipelines. The report describes an evaluation study carried out by BG to determine the capabilities of thin in-line inspection vehicle for the purpose of detecting external coating defects. The results show that the Elastic Wave vehicle, without any modification to its configuration, can detect and size known defects in experimental tests. In fact, the technique is superior to the more conventional aboveground techniques, with the potential to detect disbonding as well as areas where the coating has been removed. Further analysis on historical field data also revealed the potential for the system to detect more general coating features such as coating type transitions, top to bottom variations and swamp weights. to conclude, the Elastic Wave vehicle has enormous potential to provide information on pipeline coating condition in addition to the crack detection capabilities.

NTIS

Nondestructive Tests; Elastic Waves; Evaluation; Coatings; Gas Pipes

19980013405 NERAC, Inc., Tolland, CT USA

Lubricants and Greases: Properties and Evaluation. (Latest citations from Fluidex)

Jan. 1996; In English

Report No.(s): PB96-859723; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning a variety of lubricants, including synthetic oils and greases. Topics include properties characterization, additives, rheological studies, and uses. Bearing and gear lubricants are discussed, and lubricant testing methods are described. Some attention is given to specific applications in industry. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Lubricants; Greases; Bibliographies

19980013654 NERAC, Inc., Tolland, CT USA

Silicone Elastomers. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Jan. 1996; In English

Report No.(s): PB96-860010; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning high strength, thermally stable, extrudable, moldable, and self-adhering silicone elastomer compositions and products used in industrial and medical applications. Additives, fillers, agents, and reinforcing materials used to alter physical and chemical properties of silicone elastomers are described. The citations review applications in medical implants and prosthetic devices; waterless printing; intraocular lenses; high voltage insulators; and industrial sealants, adhesives, coatings, and encapsulants.

NTIS

Bibliographies; Silicone Resins; Elastomers

19980013903 NERAC, Inc., Tolland, CT USA

Foamed Plastics: Polyurethane Foams. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English

Report No.(s): PB96-859582; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the fabrication, physical properties, chemical characteristics, and applications of polyurethane foams. Applications in thermal insulation, vehicle bumpers, roofing systems, structural panels, packing materials, and upholstery materials are discussed. Also discussed are flammability testing, thermal and mechanical properties, and toxicity.

NTIS

Bibliographies; Polyurethane Foam; Plastic Fibers; Composite Materials

19980013929 Materials Systems, Inc., Littleton, MA USA

Near Net-shape Fabrication of Ultrafine Scale Piezoelectric Ceramic/Polymer Composites *Final Report*

Nov. 1997; 64p; In English

Contract(s)/Grant(s): N00014-92-C-0212

Report No.(s): AD-A332903; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

In this program, new net-shape forming technologies were developed for producing fine scale 1-3 and 2-2 piezoelectric ceramic/polymer composites. Piezocomposite materials having extremely fine piezoceramic elements were fabricated using a modified ceramic injection molding process similar to that developed by MSI 1 for coarse scale piezocomposite manufacturing. The principal technical challenges were to make extremely fine PZT ceramic 1-3 and 2-2 preforms without defects or distortion, and use these to and produce piezocomposite samples having sufficient thickness to achieve lateral mode-free response. PZT rods and strips having width dimensions in the order of 25 to 60 micrometers and length-to-width aspect ratios in excess of ten were demonstrated on a research scale. These were used for experimental demonstration of high frequency acoustic imaging arrays for medical ultrasound and Navy mine hunting applications. The new piezocomposite fabrication technology is finding applications ranging from diver-held sonar to low frequency mine detection and classification to advanced net-shape piezoelectric actuators. The program has influenced development of net-shape formed accelerometers for active surface control, as well as coarse receive arrays for submarine use. Under separate SBIR funding (ONR Contract number N00014-95-C-0117), the fine scale molding technology has been scaled up to the point where large (150 x 50 mm) pieces having pitch dimensions below 200 micrometers can be produced every few minutes. Prior to this work, the only net-shape forming approach available for producing piezocomposite was one developed by Siemens 2 which utilized ceramic slip casting into fugitive molds produced by x-ray photolithography.

DTIC

Cost Analysis; Injection Molding; Fabrication; Fine Structure; Piezoelectric Ceramics; Ceramic Matrix Composites

19980014083 Umea Univ., Dept. of Analytical Chemistry, Sweden

Thin Polymer and Phospholipid Films for Biosensors. Characterisation with Gravimetric, Electrochemical and Optical Methods

Tjaernhage, T., Umea Univ., Sweden; Apr. 19, 1996; 29p; In English; Figures in this document may not be legible in microfiche Report No.(s): PB97-101901; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The successful fabrication of biosensors often necessitates that the biomolecules employed are incorporated into a thin film attached to the transducer surface. In this thesis, two types of such films were examined with respect to some fundamental properties that are essential for biosensor applications.

NTIS

Thin Films; Biochemistry; Bioinstrumentation

19980014109 Naval Postgraduate School, Monterey, CA USA

Metallization of CVD Diamond Using Metal Oxide Intermediate Layers for Electronics Packaging

Kroll, Darwin E., Naval Postgraduate School, USA; Mar. 1997; 65p; In English

Report No.(s): AD-A331060; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The high thermal conductivity of chemically vapor deposited CVD diamond (up to 2000 W/m/K) and its low dielectric constant (approx. 5.6) makes it highly desirable for use as an electronics packaging substrate material. To make CVD diamond amenable to thick film metallization via standard industrial processes, a thin gamma-alumina layer (approx. 1500Å) was grown on diamond by reactive evaporation of Al in oxygen over a very thin Cr intermediate-layer (approx. 700Å). Commercially available silver and gold thick films were applied to CVD diamond both with and without the metal-oxide inter-layer. The interfaces were characterized by scanning electron microscopy, energy dispersive x-ray spectroscopy, Auger electron spectroscopy and transmission electron microscopy. The intermediate oxide layer was found to result in well-adherent, chemically bonded interfaces between the metallization and the CVD diamond substrates for both Ag and Au pastes. Without the oxide layer, the Ag paste was found to have very poor adhesion to the substrate. The Au paste, developed for non-oxide substrates, was found to be nominally adherent to the CVD substrate, although quantitative adhesion comparisons between the metallization with and without the oxide inter-layer was not obtained. Microstructural and chemical characterization studies of the interface suggest that the alu-

mina layer enhances adhesion by producing chemically-reacted/solid-solution species across all interfaces and is therefore a very versatile approach for thick film metallization of CVDD.

DTIC

Aluminum Oxides; Auger Spectroscopy; Chemical Bonds; Diamond Films; Diamonds; Dispersing; Electron Spectroscopy; Evaporation; Metal Films; Metal Oxides; Metallizing; Microstructure; Thick Films

19980014217 NERAC, Inc., Tolland, CT USA

Pressure Sensitive Adhesive Tapes. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-852975; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning pressure sensitive adhesive (PSA) tape. References cite technological innovations for manufacture and applications. Citations focus on uses in crop protection, sports, medicine, and composition. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Adhesives

19980014225 NERAC, Inc., Tolland, CT USA

Thermoplastic Rubbers. (Latest Citations from the Rubber and Plastics Research Association Database)

Feb. 1996; In English

Report No.(s): PB96-863139; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the applications, properties, and processing of thermoplastic rubbers. Among the materials discussed are polypropylenes, polyvinyl chlorides, polystyrenes, kratons, santoprenes, polyethylenes, and europrenes. The citations review applications for the manufacture of pressure-sensitive adhesives and examine use of new primers for thermoplastic rubber compounds. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Rubber; Plastics; Thermoplastic Resins

19980014228 NERAC, Inc., Tolland, CT USA

Electroless Plating of Polymeric Substrates (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863261; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning electroless plating techniques used for materials deposition on polymer substrates. Topics include plating methods and compositions used in printed circuit device fabrication. Plating solution preparations, and substrate surface treatment methods are also included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Electroless Deposition; Plating; Plastics; Coatings

19980014231 NERAC, Inc., Tolland, CT USA

Barrier Properties of Packaging Materials. (Latest citations from Packaging Science & Technology Abstracts (PSTA))

Jan. 1996; In English

Report No.(s): PB96-859327; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the fabrication and utilization of polymeric packaging materials that possess barrier properties to gases, moisture, and bacteria. Packaging for food, medical, pharmaceutical, and cosmetic products is discussed. Effects of the enclosed product on the barrier properties of the packaging or any effects the packaging materials may have on the enclosed product are also presented. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Polymeric Films; Packaging; Barrier Layers

19980014431 Georgia Univ., Dept. of Chemistry, Athens, GA USA

Formation of Thin-Films of CdTe, CdSe, and CdS by Electrochemical ALE, May 1996 - Sep. 1997

Colletti, Lisa P., Georgia Univ., USA; Flowers, Billy H., Georgia Univ., USA; Stickney, John L., Georgia Univ., USA; Oct. 16, 1997; 38p

Contract(s)/Grant(s): N00014-19-J-1919

Report No.(s): AD-A331048; TR-27; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Thin-films of CdTe, CdSe, and CdS have been electrodeposited by electrochemical atomic layer epitaxy (ECALE), using an automated electrochemical deposition system. Previous reports of an automated system for forming ECALE deposits involved use of a small thin layer flow cell, which evidenced several drawbacks. Conversion of the thin layer cell to a thick layer design resulted in greatly improved deposit quality and reproducibility. Deposits were analyzed using electron probe microanalysis (EPMA), scanning electron microscopy (SEM), and grazing-incident X-ray diffraction (XRD). The results were consistent with a layer by layer growth mode, and the principles of atomic layer epitaxy. CdTe films were grown using up to 1000 ECALE cycles, and were stoichiometric through 500. The 1000 cycle films were a few percent rich in Te, under the conditions used. CdSe and CdS films formed also contained some excess chalcogenide, probably the result of less than ideal deposition parameters. Increasing amounts of particulates and surface roughening were observed for the 500 and 1000 cycle CdTe and CdSe films, relative to the 200 cycle deposits normally formed. This roughening may result from the excess chalcogenide. X-ray diffraction of the films indicated cubic crystal structures with preferred (111) orientations, for all three compounds.

DTIC

Thin Films; Cadmium Selenides; Cadmium Tellurides; Chalcogenides; Atomic Layer Epitaxy

19980014433 Harvard Univ., Div. of Applied Sciences, Cambridge, MA USA

Microbial Degradation of Polymeric Materials

Gu, Ji-Dong, Harvard Univ., USA; Ford, T. E., Harvard School of Public Health, USA; Thorp, K., Dayton Univ. Research Inst., USA; Mitchell, R., Harvard Univ., USA; Jun. 23, 1994; 14p; In English; Tri-Service Conference on Corrosion, 21-23 Jun. 1994, Orlando, FL, USA

Report No.(s): AD-A331109; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Microorganisms and their products may be responsible for changes in physical, chemical, and electrochemical properties of polymeric materials. We investigated microbial degradation of polyimides used as insulators in electronic packaging. Growth of microorganisms on these polymers was found to result in loss of their dielectric properties. Failure of polyimide films on stainless steel coupons caused by microbial degradation was evaluated with a fungal consortium partially identified as *Aspergillus versicolor*. We obtained distinctive electrochemical impedance spectroscopy (EIS) spectra showing failed polyimides in the presence of the fungal consortium. Decrease of film resistance by two orders of magnitude relative to uninoculated control systems was observed within one week of incubation. The relationship between changes of impedance spectra and microbial degradation of the coatings was further established by scanning electron microscopic (SEM) observations of fungi on the surface of the polyimides. We also studied the biodeterioration of fiber reinforced composites, graphite sheets, and graphite fibers used in composite materials. One set of samples was inoculated with the fungal consortium mentioned above, and another set was kept sterile. In all inoculated treatments the fungi adhered to and grew on the composites, graphite sheets, and fiber surfaces. SEM was used to determine adhesion of fungi and subsequent etching of the samples. Fungal penetration into composite resin and graphite sheets was observed. Our data indicate that fungi may cause substantial damage to composites under conditions favorable to fungal growth.

DTIC

Dielectric Properties; Etching; Graphite; Impedance; Insulators; Microorganisms; Scanning Electron Microscopy

19980014452 Pennsylvania State Univ., Center for Advanced Materials, University Park, PA USA

High Temperature Oxidation of Silicon Carbide Reinforced Alumina Topical Report, 1 Sep. 1991 - 30 Nov. 1995

Newcomb, S. A., Pennsylvania State Univ., USA; Tressler, R. E., Pennsylvania State Univ., USA; Spear, K. E., Pennsylvania State Univ., USA; Mar. 1996; 153p; In English

Report No.(s): PB96-193453; CAM-9601; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The problem of the oxidation of SiC reinforced alumina (SCRA) was studied from two perspectives: the effect of Al on the oxidation of SiC and the role that geometry plays on composite rate constants. Although an increase in parabolic rate constants for oxidation of SiC ion implanted with Al at the 1.5 and 7.5 at% level at 1200 C and 1400 C was measured, it was too small to explain the oxidation rate constants reported in the literature for SCRA composites. A model was derived for the oxidation of SCRA composites which incorporated the volume fraction and particle radius of the reinforcement phase. Starting from a solution

for the general moving boundary problem, an expression was derived to relate the removal of oxygen from the diffusing front on the macroscopic scale to the decrease in particle size on the microscopic scale. The rate limiting step in SCRA oxidation was oxygen diffusion through the alumina matrix. The model also showed that the width of the interface boundary was determined primarily by the ratio of the diffusivities of the reactive species through the matrix and reaction product. A comparison between the oxidation rates for monolithic SiC and SCRA composites showed that the embedded SiC oxidized approximately 70 times faster. The increase was 16 times the rate measured for the highest concentration Al-doped SiC crystals indicating that not all of the increase could be explained by geometry and the Al effect.

NTIS

Silicon Carbides; Aluminum Oxides; Oxidation; Composite Materials; Reinforcing Materials; Doped Crystals

19980014456 NERAC, Inc., Tolland, CT USA

Antifouling Coatings: Marine Applications. (Latest citations from Oceanic Abstracts)

Jan. 1996; In English

Report No.(s): PB96-859707; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning protective coatings, sheathings, and other methods for the prevention of marine fouling. Biochemistry of tin based organometallic compounds and their toxic properties are discussed. Applications of these coatings to ship hulls and ocean thermal energy conversion systems are emphasized. Coating life relative to the controlled release of the toxicants is also considered. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Antifouling; Bibliographies; Protective Coatings

19980014509 Department of the Navy, Washington, DC USA

Novel Linear Metallocene Polymers Containing Acetylenic and Inorganic Units and Thermosets and Ceramics Therefrom

Keller, Teddy, Inventor, Department of the Navy, USA; Houser, Eric J., Inventor, Department of the Navy, USA; Mar. 14, 1997; 50p; In English

Patent Info.: US-Patent-Appl-SN-815013

Report No.(s): AD-D018632; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Organometallic linear polymers containing metallocene, inorganic units (such as silicon and boron), and acetylenic units which display superb processability, and which are readily converted to a thermoset through the acetylenic groups, yielding high temperature thermosetting polymers and ceramics that exhibit outstanding long-term thermal (high char yield) and magnetic properties and synthesis of these are presented.

DTIC

Ceramics; Organometallic Polymers; Inorganic Materials

19980014525 NERAC, Inc., Tolland, CT USA

Ceramics Technology: Automotive Gas Turbine Engine Component Applications. (Latest citations from the NTIS Bibliographic Database)

Apr. 1996; In English; Page count unavailable.

Report No.(s): PB96-868161; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the technological development of ceramic materials for use in design and manufacture of gas turbine engine components. Citations discuss the fabrication of ignition system components, combustion chamber parts, gas-path seals, rotors, stators, nozzles, blades, and heat exchangers. Ceramic metal composites for engine components are also examined. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Automobile Engines; Ceramics; Engine Parts; Bibliographies; Gas Turbine Engines

19980014529 NERAC, Inc., Tolland, CT USA

Plasma and Flame Sprayed Coatings. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Apr. 1996; In English; Page count unavailable.

Report No.(s): PB96-868104; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning devices and processes employed in the application of plasma and flame sprayed coatings on industrial products and equipment. Metallic and ceramic materials used in heat, abrasion, corrosion, and radiation resistant coatings are analyzed. Sprayed coatings used for turbine engine sealing and shroud restoring, and antireflecting coatings on solar cells are also discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Plasma Spraying; Sprayed Coatings

19980015100 NERAC, Inc., Tolland, CT USA

Protection of Automotive Components (Latest Citations from METADEX)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-862750; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the materials and processes used to protect automotive components. Coating processes reviewed include galvanizing, oxidation, phosphating, chromating, zinc, hot-dip, and electroless plating. Composite and polymer coatings are also considered. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Protective Coatings; Coating; Automobiles

19980015102 NERAC, Inc., Tolland, CT USA

Prosthetic Devices: Polymeric Materials Utilization. (Latest Citations from the Ei Compendex*Plus Database)

Mar. 1996; In English

Report No.(s): PB96-866272; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the utilization of plastic and elastomeric materials in prosthetic devices. Topics include load studies, fabrication methods, wear analysis, failure prediction, and blood tolerance studies. The use of mathematical models for design and mechanical properties analysis is also treated. Coverage includes use of polymeric materials in hip and knee joints and in valves. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Prosthetic Devices; Bibliographies; Elastomers; Plastics

19980015103 NERAC, Inc., Tolland, CT USA

Solar Control Films. (Latest Citations from the Energy Science and Technology Database)

Mar. 1996; In English

Report No.(s): PB96-866231; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning films and coatings used to control the amounts of ultraviolet and infrared radiation passing through glazing and other solar materials. Articles discuss thin polymeric films, ceramic films, gas-filled laminates, electrochromic films, and pigmented coatings. Citations address applications to glazing materials and passive and active solar arrays; cost and economic analysis; energy conservation; and materials properties. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Polymeric Films; Protective Coatings

19980015115 Department of the Navy, Washington, DC USA

Zinc Oxide Stabilized Zirconia

Qadri, Syed B., Inventor, Department of the Navy, USA; Skelton, Earl F., Inventor, Department of the Navy, USA; Lubitz, Peter, Inventor, Department of the Navy, USA; Feb. 27, 1997; 14p; In English

Patent Info.: US-Patent-Appl-SN-806375

Report No.(s): AD-D018631; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Zinc oxide stabilized zirconia containing zirconia in cubic phase is prepared by evaporating zirconia and zinc oxide and depositing zirconia and zinc oxide on an atomic scale on a substrate. The stabilized zirconia resists corrosion at high temperatures above 1000 deg C, can be used as a part of a barrier coating, is transparent to visible light, and is electrically conducting.

DTIC

Zirconium Oxides; Zinc Oxides; Evaporation; Stabilization

19980015142 Ohio State Univ., Dept. of Physics, Columbus, OH USA

Light-Emitting Devices Based on Pyridine-Containing Conjugated Polymers

Wang, Y. Z., Ohio State Univ., USA; Gebler, D. D., Ohio State Univ., USA; Fu, D. K., Ohio State Univ., USA; Swager, T. M., Ohio State Univ., USA; Macdiarmid, A. G., Ohio State Univ., USA; Sep. 20, 1997; 6p; In English

Contract(s)/Grant(s): N00014-95-I-0302; N000-14-92-J-1369

Report No.(s): AD-A330172; TR-P290; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

We report the fabrication of light-emitting devices based on several pyridine-containing conjugated polymers and copolymers in various device configurations. The high electron affinity of pyridine based polymers enables the use of relatively stable metals such as Al or even ITO as electron injecting contacts. Taking advantages of the better electron transport properties of the pyridine-containing polymers, we fabricate bilayer devices utilizing poly(9-vinyl carbazole) (PVK) as hole transporting/electron blocking polymer, which improves the device efficiency and brightness significantly due to the charge confinement and exciplex emission at the PVK/emitting polymer interface. The incorporation of conducting polyaniline network electrode to PVK reduces the device turn on voltage significantly while maintaining the high efficiency. The control of the aggregate formation in the polymer films by blending with insulating host polymers opens up the possibility of making voltage-controlled multi-color light-emitting devices.

DTIC

Light Emitting Diodes; Fabrication; Copolymers; Polymeric Films; Metals; Electron Transfer; Transport Properties; Electron Affinity

19980015165 Materials Modification, Inc., Fairfax, VA USA

Multilayer Microlaminated Ceramic Thermal Barrier Coating Final Report, Aug. 1996 - Feb. 1997

Yu, Charles, Materials Modification, Inc., USA; Yao, Zhen-Gui, Materials Modification, Inc., USA; Krupashankara, M. S., Materials Modification, Inc., USA; Ritter, Joseph, Materials Modification, Inc., USA; May 14, 1997; 25p; In English

Contract(s)/Grant(s): F49620-96-C-0042

Report No.(s): AD-A331307; AFOSR-TR-97-0544; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report describes the Phase I effort to develop a new-approach for applying micro-laminated thermal barrier coatings on superalloys through a sol-gel process. This Phase I has demonstrated the following: (1) Cubic zirconia (yttria-stabilized-zirconia) can be coated through a sol-gel process onto bond coated superalloys. The films have very good adhesion and cohesion demonstrated by tape test. The films on the other side of the superalloy without bond coat peeled off very easily. (2) Zircon can be coated onto the yttria-stabilized-zirconia layer as a reinforcement layer. The glassy phase may help to relieve the stress during thermal cycling. (3) Cubic zirconia can be coated onto the zircon layer. The feasibility of applying multilayer thermal barrier coating with micro-laminated structure through a sol-gel approach has been clearly demonstrated. (4) The cubic zirconia films are stable at 1100 C, which is close to the service temperature of a turbine engine. The crystallization of the cubic zirconia can be achieved at 500 C. This new approach has better control of not only the process parameters but also the coating compositions and micro-structures. Both thermal and mechanical characteristics of the coatings can be potentially optimized.

DTIC

Thermal Stability; Multilayer Insulation; Laminates; Ceramic Coatings; Thermal Control Coatings; Barrier Layers; Sol-Gel Processes

19980015215 NERAC, Inc., Tolland, CT USA

Cyanoacrylates: Composition and Properties. (Latest Citations from World Surface Coatings Abstracts)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864715; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the synthesis, composition, and properties of cyanoacrylates. Applications of these materials include protective coatings, adhesives, filler compositions for porous media, optically transparent coatings and

adhesives, carriers of photosensitive materials, and conductive coatings. Properties are examined, including thermal stability, bonding strength, optical transparency, quick setting qualities, corrosivity, toxicity, water resistance, and storage.

NTIS

Bibliographies; Adhesives; Copolymers; Synthesis (Chemistry); Chemical Properties; Composite Materials; Acrylates

19980015217 NERAC, Inc., Tolland, CT USA

Ion Beam Deposition. (Latest Citations from the Searchable Physics Information Notices Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864731; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning material deposition using ion beams. Ion beams, ion assist, ion implants, ion plating, reactive ion beams, and ionized cluster beams are discussed. Characterizations of films deposited with ion beams are presented. Superconductors are excluded and examined in a separate bibliography.

NTIS

Bibliographies; Deposition; Ion Beams; Ion Implantation; Vacuum Deposition; Coatings

19980015222 NERAC, Inc., Tolland, CT USA

Vacuum Deposition of Thin Films. (Latest Citations from the Searchable Physics Information Notices Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864483; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the deposition of thin films under high vacuum conditions. Topics include the evaporative coating of a sphere from a point source; superconducting and dielectric films; and films formed by reactive evaporation, rapid thermal annealing, and laser evaporation. Analyses, characterization, and methods of preparation of the films are included. Films prepared by chemical vapor deposition, and ion beam deposited films are excluded.

NTIS

Bibliographies; Thin Films; Vacuum Deposition; Annealing; Superconducting Films

19980015229 NERAC, Inc., Tolland, CT USA

Magnetic Structure and Properties of Rare-Earth Glassy Alloys. (Latest Citations from the INSPEC Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864103; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning magnetic structures, magnetic properties, and magnetic behavior of a wide variety of glassy or amorphous rare-earth alloys under various conditions. Consideration is also given to uses of rare-earth glasses as semiconductors, superconductors, permanent magnet materials, and magnetic thin films. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Rare Earth Alloys; Magnetic Properties; Metallic Glasses

19980015233 NERAC, Inc., Tolland, CT USA

Cermets. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864152; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning the fabrication and applications of cermet materials and devices. Preparation methods of cermet films and coatings are discussed. In addition, the citations explore the use of cermets in cutting tools, electrodes and anodes, sensors, electrolysis for electrowinning of metals, abradable structures for high temperature applications, and high density electronics.

NTIS

Bibliographies; Cermets; Fabrication; Ceramic Coatings; Thin Films

19980015237 NERAC, Inc., Tolland, CT USA

Piezoelectric Polymers. (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864582; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning studies and applications of piezoelectric polymers. Topics include piezoelectric polymer films, devices, and coating techniques; and piezoelectric polymer composites and their fabrication techniques. The uses of piezoelectric polymer materials in heat exchangers, transducers, hydrophone and microphone devices, and ultrasonic detection instruments are presented.

NTIS

Bibliographies; Piezoelectric Transducers; Piezoelectric Ceramics; Ferroelectric Materials

19980015240 NERAC, Inc., Tolland, CT USA

Environmental Stress Cracking of Plastics. (Latest Citations from the Rubber and Plastics Research Association Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864707; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning environmental stress cracking of plastics. Materials discussed are polyvinyl chloride, polyethylene, polyurethane, glassy polymers, acrylonitrile butadiene styrene, teflon, high density polyethylene, high impact polystyrene, and polycarbonate. References pertaining to glass reinforced plastics are included. Techniques for testing resistance are also referenced.

NTIS

Bibliographies; Stress Corrosion; Polyvinyl Chloride; Polyethylenes; Polystyrene; Teflon (Trademark); Cracking (Fracturing)

19980015326 NERAC, Inc., Tolland, CT USA

Metallization of Plastics. (Latest citations from the Ei Compendex*Plus database)

Jan. 1996; In English

Report No.(s): PB96-859434; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the metallization of plastics and plastic films using a variety of application techniques. Methods described include vapor deposition, sputtering, and electroless plating. Plastic surface preparation prior to the metallization process is discussed. Metallized plastics for the packaging industry, electromagnetic shielding, and decorative coatings are among the applications included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Metallizing; Plastics

19980015327 NERAC, Inc., Tolland, CT USA

Cutting Fluids: Lubrication, Heat Transfer, and Corrosion Prevention. (Latest citations from METADEX)

Jan. 1996; In English

Report No.(s): PB96-859350; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning cutting fluids for a wide variety of machining applications and materials. The lubrication, heat transfer, and anticorrosive properties of these fluids are emphasized as they pertain to tool life and fluid stability. Problems associated with fluid disposal and environmental effects are also included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Coolants; Corrosion Prevention; Heat Transfer; Lubrication; Metal Cutting

19980015345 NERAC, Inc., Tolland, CT USA

Reinforced Structural Foam. (Latest citations from the Rubber and Plastics Research Association Database)

Jan. 1996; In English

Report No.(s): PB96-859392; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the incorporation of synthetic fiber reinforcement into the manufacture of polymeric structural foam. Glass, mica flakes, and carbon are among the reinforcing agents examined for such resins as polyurethane, polypropylene, and isocyanurate structural foams. Applications in the automobile, aircraft, sports, and appliance industries; considerations for reaction injection molding processes and materials; and economic ramifications are included. Constructions with honeycomb or sandwich structures are covered in separate bibliographies. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Reinforcing Fibers; Foams; Synthetic Fibers; Composite Materials

19980015358 Georgia Inst. of Tech., School of Materials Science and Engineering, Atlanta, GA USA

Evaluation of Gas-Fired Immersion Tube Materials for Glass Melting Furnaces *Final Report, 1 Sep. 1992 - 1 Apr. 1994*

Speyer, R. F., Georgia Inst. of Tech., USA; Nov. 30, 1995; 195p; In English

Contract(s)/Grant(s): GRI-5092-236-2465

Report No.(s): PB97-177075; GRI-95/0155; No Copyright; Avail: CASI; A09, Hardcopy; A03, Microfiche

Materials were developed for the application of immersed heating of molten glass using natural gas. The mechanisms of corrosion in molten glass (E-glass and soda-lime-silicate glass) at 1560 C and combustion products at 1600 C were established experimentally, and confirmed with thermodynamic models for a number of candidate materials. A tube wall made of a functional gradient of MoSi₂ contact with oxidizing gases, and Mo in contact with glass was devised and demonstrated. A method of corrosion protection was devised involving applying a cathodic potential to the immersed tube. Heat transfer models showed that convective heat transfer from combustion products to the tube was rate limiting. Suggested tube processing methods were slip casting and plasma spraying.

NTIS

Pipes (Tubes); Corrosion Prevention; Molybdenum Compounds; Natural Gas; Furnaces; Glass; Melting

19980015368 NERAC, Inc., Tolland, CT USA

Ceramic Heaters. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864756; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning ceramic heaters and their applications. Topics include compositions and fabrication methods for ceramic composites having properties of high temperature oxidation and corrosion resistance, thermal shock resistance, and high mechanical strength at high temperatures. Industrial applications of heater systems include use in diesel engine glow plugs, diesel fuel filters, fuel evaporation emission control, exhaust gas cleaning, vehicular air heating, gas sensing, oxygen sensors, gas lasers, and diamond synthesis.

NTIS

Bibliographies; Ceramics; Technology Utilization; Ceramic Matrix Composites; Heating Equipment

19980015389 Massachusetts Inst. of Tech., Cambridge, MA USA

Influence of Composition, Chain Architecture and Processing on Polymer Structure and Properties *Final Report, 1 Apr. 1994 - 31 Mar. 1997*

Thomas, Edwin L., Massachusetts Inst. of Tech., USA; Jul. 10, 1997; 10p; In English

Contract(s)/Grant(s): F49620-94-1-0224; AF Proj. 2303

Report No.(s): AD-A329683; AFOSR-TR-97-0382; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This project concerned the fundamental understanding of processing-structure and structure-property relations in block copolymer and liquid crystalline polymer systems. Key to our studies was the availability of model materials which afforded opportunities via new chemical compositions and physical properties. Transmission electron microscopy, low voltage high resolution scanning electron microscopy, light microscopy and atomic force microscopy as well as wide and small angle x-ray scattering were the principal characterization tools. We also employed a special roll cast process to form highly textured samples for investigation of their physical properties. Principal research accomplishments are grouped into 6 areas: influence of architecture on phase behavior; development of experimental techniques; microphase separation in block copolymers; large strain deformation of single crystal thermoplastic elastomers; morphology and dynamic interaction of defects in polymer liquid crystals; and technology transitions.

DTIC

Chemical Composition; Crystallinity; Low Voltage; Morphology; Scanning Electron Microscopy; Single Crystals

19980015427 Winter (Steven) Associates, Inc., Norwalk, CT USA

Structural Insulated Panels Produced from Recycled Expanded-Polystyrene (EPS) Foam Scrap Final Report

Grinnell, A., Winter (Steven) Associates, Inc., USA; Nov. 1996; 88p; In English

Report No.(s): PB97-136626; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This report documents a research project undertaken to assess the feasibility of using scrap reground expanded polystyrene (EPS) in the manufacture of structural insulated panels (SIPs) in order to save material costs and reduce the amount of EPS waste products to be disposed. The report documents the manufacturing and testing process and concludes that there was relatively little difference in the thermal and structural characteristics under normal loading conditions of the panels tested with varying amount of regrind (from 10% - 25%) and those made with 100% virgin beads. The report recommends that additional test be undertaken, but suggests that, based on the test results, reground EPS can be successfully used in the cores of SIPs in amounts up to 25%.

NTIS

Polystyrene; Thermal Insulation

19980015610 NERAC, Inc., Tolland, CT USA

Solid Lubricants: Molybdenum Compounds. (Latest citations from the Ei Compendex*Plus database)

Jan. 1996; In English

Report No.(s): PB96-859673; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the preparation, applications, properties, and testing of molybdenum compound solid lubricants. Discussions of applications in the metal working, aerospace, and automotive industries are included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Solid Lubricants; Bibliographies; Molybdenum Compounds

19980015619 TRC Environmental Consultants, Inc., Chapel Hill, NC USA

Solvent-Based to Waterbased Adhesive-Coated Substrate Retrofit, Volume 4, Film and Label Manufacturing Case Study, FLEXcon Company, Incorporated Final Report, Nov. 1992 - Jun. 1993

McMinn, B. W., TRC Environmental Consultants, Inc., USA; Snow, W. S., TRC Environmental Consultants, Inc., USA; Bowman, D. T., TRC Environmental Consultants, Inc., USA; Dec. 1995; 29p; In English

Report No.(s): PB96-180468; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This volume discusses a visit to a site operated by Flexcon Company Incorporated, a pressure-sensitive adhesive coating, to collect information on the pollution prevention opportunities and barriers associated with waterbased adhesives. Chapter 2 includes the market profile and overall plant description. Chapter 3 provides a general process description. Chapter 4 discusses environmental issues associated with process conversion. Chapter 5 describes Flexcon's waterbased adhesive formulation experience. Chapter 6 identifies the opportunities for future use waterbased and other adhesives at Flexcon.

NTIS

Industrial Plants; Adhesives; Solvents; Coatings; Substrates; Data Acquisition; Pollution Control

19980015630 Northwestern Univ., Basic Industry Research Lab., Evanston, IL USA

A Nano-Modulated Ceramic Coating Deposition System Final Report, 1 Aug. 1995 - 31 Jul. 1996

Sproul, William D., Northwestern Univ., USA; Lefkow, Anthony R., Northwestern Univ., USA; Oct. 31, 1996; 14p; In English
Contract(s)/Grant(s): F49620-95-I-0501

Report No.(s): AD-A329768; AFOSR-97-0345TR; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report outlines the design, construction, and implementation of a Nano-modulated ceramic coating deposition system. The deposition system was designed to deposit multilayer (superlattice) coatings of two or more oxide or other non-conducting materials. The system has two cathodes opposed to each other with their magnetic fields forming a closed loop, which enhances the current into the substrate. The deposition system takes advantage of the latest developments in vacuum and characterization technologies to ensure a repeatable process. It is equipped with cryopumps on the main chamber and the load lock for fast pump-down and minimization of system contamination. Peripheral equipment includes an rf plasma probe for determination in real time of the plasma impedance, and an in-situ ellipsometer for real time characterization of one of the films making up the superlattice.

DTIC

Construction; Contamination; Deposition; Ellipsometers; Feedback Control; Impedance; Loads (Forces); Magnetic Fields; Optimization

19980015749 NERAC, Inc., Tolland, CT USA

Metglas: Traits and Applications. (Latest Citations from the INSPEC Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864376; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the physical properties and optimal use of Metglas. Properties and characteristics, methods for improving characteristics, and studies of crystallization and atomic structure are included. Topics cover domain walls, interlamellar spacing, magnetic qualities, and performance under stress. Applications in sensors, delay lines, transformers, transducers, magnetic switches, magnetometers, and spectrometers are discussed.

NTIS

Bibliographies; Crystallization; Metallic Glasses; Chemical Properties

19980015750 NERAC, Inc., Tolland, CT USA

Ferroelectric Ceramics. (Latest Citations from the INSPEC Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864202; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning research, development, and applications of ferroelectric ceramics. Electrical and physical properties with respect to microstructure, ferroelectric characteristics, and sintering and photovoltaic effects are discussed. Citations also examine applications in capacitors, actuators, sensors, switching, and various electronic devices. Citations concerning piezoelectric and PLZT ceramics are covered in separate bibliographies. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Ferroelectric Materials; Ceramics

19980015921 SRI InterNational Corp., Menlo Park, CA USA

Low-Cost, Corrosion-Resistant Coatings for Steel Rebars and Components *Final Report*

Sanjurjo, A., SRI InterNational Corp., USA; Jayaweera, P., SRI InterNational Corp., USA; Lowe, D., SRI InterNational Corp., USA; Lau, K., SRI InterNational Corp., USA; Aug. 16, 1995; 32p; In English

Report No.(s): PB96-148002; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This research is a follow-on study from a previous SHRP-IDEA project in which a corrosion-resistant Si-Ti coating on steel rebars was produced using fluidized bed technology. The current project scaled up the coating process. A bench-scale reactor system was designed and shown feasible for coating 3-ft long steel rebars. Further research has shown that strong and coherent coating also could be produced by a plasma spray process or simply by spray painting metal powder mixture (along with a flux) followed by low heat treatment (about 600 C). The results demonstrate that corrosion resistance coatings of various metals and alloys such as Si, Ni, Ti, and Ti-Ni can be formed on steel rebars by fluidized bed chemical vapor deposition (FBR-CVD), paint-and-heat, or FBR-plasma spray techniques. The paint-and heat process appears most suitable for commercial application. Data on microstructural characteristics of the coated steel surface and corrosion resistance are presented.

NTIS

Metal Coatings; Low Cost; Corrosion Resistance; Steels; Coating; Technologies

19980015926 NERAC, Inc., Tolland, CT USA

Glass Ceramics. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English

Report No.(s): PB96-859517; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, development, evaluation, and applications of glass ceramics. Citations discuss fabrication and testing of glass ceramic materials for high strength, high thermal expansion, and high voltage applications. Applications in lasers, solar concentrators, metal seals and metal bondings, pyrotechnic devices, insulators for vacuum tubes, nuclear waste treatment, capacitance thermometers, millimeter wave devices, biomaterials, and automobile thermal reactors are examined. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Glass; Ceramics

19980015927 TRC Environmental Consultants, Inc., Chapel Hill, NC USA

Evaluation of Barriers to the Use of Radiation-Cured and Hot Melt Coatings in Coated and Laminated Substrate Manufacturing Final Report, Jun. 1993 - Apr. 1994

Vitas, J. B., TRC Environmental Consultants, Inc., USA; Mcminn, G. D., TRC Environmental Consultants, Inc., USA; Blake, W. L., TRC Environmental Consultants, Inc., USA; Mar. 1996; 111p; In English

Report No.(s): PB96-153564; CH-94-56; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The report gives results of a study to investigate and identify the technical, educational, and economic barriers to the use and implementation of radiation-cured and hot melt coatings in coated and laminated substrate manufacturing. The report identifies work areas that could help overcome identified technical, educational, and economic barriers. The discussed opportunities include: (1) convening a focus group to discuss identified barriers, identify other barriers, and begin the process to overcome these carriers; (2) investigating the use of radiation-curable systems in Europe; (3) researching the marketing difficulties associated with nonsolvent-based products; and (4) investigating state economic incentive programs to determine if financial assistance can be given to manufacturing facilities to help encourage the testing of radiation-curable adhesives.

NTIS

Laminates; Evaluation; Radiation Dosage; Coatings; Surface Finishing; Technologies; Curing

19980016018 NERAC, Inc., Tolland, CT USA

Protective Coatings: Vapor Deposition. (Latest citations from METADEX)

Jan. 1996; In English

Report No.(s): PB96-859665; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the use of vapor deposition to apply protective coatings to materials subjected to erosive or corrosive environments. These coatings include aluminides, hot corrosion resistant superalloys, borides, and direct deposition of chromium. Applications include gas turbine blades, boiler tubes and nuclear reactors. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Protective Coatings; Vapor Deposition

19980016087 NERAC, Inc., Tolland, CT USA

Luminescent, Pearlescent, and Fluorescent Coatings. (Latest Citations from World Surface Coatings Abstracts)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864350; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the manufacture and applications of paints, coatings, and dyes with luminescent, pearlescent, phosphorescent, and fluorescent properties. Applications include markings and signs for safety or warning, colorants for plastics and textiles for lightfastness and eye appeal, whitening agents for coatings and adhesives, and dyes and pigments for penetrant tests and luminescent screen phosphors. (

NTIS

Bibliographies; Coatings; Paints; Luminescence; Dyes

19980016088 NERAC, Inc., Tolland, CT USA

Spray Forming. (Latest Citations from METADEX)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864384; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the spray forming of metals and ceramic refractory materials. Citations discuss the methods of application. Materials covered include tungsten, astroloy, aluminas, and silicides. Microstructure, uniformity, processability, and mechanical performance of materials deposited are discussed in detail.

NTIS

Bibliographies; Sprayed Coatings; Metals; Ceramics; Sprayers; Mechanical Properties

19980016131 NERAC, Inc., Tolland, CT USA

Thermal Insulating Materials. (Latest Citations from Information Services in Mechanical Engineering Database)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863832; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning medium and high temperature thermal insulating materials. Various types of insulating materials are examined with respect to their properties and suitability for insulating electrical generators, solar heating and cooling systems, furnaces, and rocket motors. Ceramics, silica, and polyethylene are among the materials considered. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Thermal Insulation; Refractory Materials

19980016167 NASA Lewis Research Center, Cleveland, OH USA

Surface Chemistry, Microstructure, and Tribological Properties of Cubic Boron Nitride Films

Watanabe, Shuichi, NASA Lewis Research Center, USA; Wheeler, Donald R., NASA Lewis Research Center, USA; Abel, Phillip B., NASA Lewis Research Center, USA; Street, Kenneth W., NASA Lewis Research Center, USA; Miyoshi, Kazuhisa, NASA Lewis Research Center, USA; Murakawa, Masao, Nippon Inst. of Tech., Japan; Miyake, Shojiro, Nippon Inst. of Tech., Japan; Jan. 1998; 20p; In English

Contract(s)/Grant(s): RTOP 523-22-13

Report No.(s): NASA-TM-113163; NAS 1.15:113163; E-10753; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report deals with the surface chemistry, microstructure, bonding state, morphology, and friction and wear properties of cubic boron nitride (c-BN) films that were synthesized by magnetically enhanced plasma ion plating. Several analytical techniques - x-ray photoelectron spectroscopy, transmission electron microscopy and electron diffraction, Fourier transform infrared spectroscopy, atomic force microscopy, and surface profilometry - were used to characterize the films. Sliding friction experiments using a ball-on-disk configuration were conducted for the c-BN films in sliding contact with 440C stainless-steel balls at room temperature in ultrahigh vacuum (pressure, $10(\text{exp } -6)$, in ambient air, and under water lubrication. Results indicate that the boron-to-nitrogen ratio on the surface of the as-deposited c-BN film is greater than 1 and that not all the boron is present as boron nitride but a small percentage is present as an oxide. Both in air and under water lubrication, the c-BN film in sliding contact with steel showed a low wear rate, whereas a high wear rate was observed in vacuum. In air and under water lubrication, c-BN exhibited wear resistance superior to that of amorphous boron nitride, titanium nitride, and titanium carbide.

Author

Boron Nitrides; Microstructure; Wear Resistance; Ion Plating; Sliding Friction; Protective Coatings; Thin Films; Tribology

19980016313 NERAC, Inc., Tolland, CT USA

Fillers for Plastics. (Latest Citations from the Ei Compendex*Plus Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864699; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning research and innovations in filler technology for thermoplastic and thermosetting composite materials. Calcium carbonate, talc, silica, clay, calcium sulfate, mica, glass beads, and alumina trihydrate are among the fillers examined relative to such considerations as magnetic properties, electric properties, impact resistance, radiation shielding, and flame retardancy. Considerations for processing filled thermoplastics are also included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Fillers; Plastics

19980016314 NERAC, Inc., Tolland, CT USA

Sol Gel Processes. (Latest Citations from the Energy Science and Technology Database)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863865; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)); US Sales Only, Microfiche

The bibliography contains citations concerning the development and applications of sol-gel processes and techniques in the production of glass compositions, coatings, fiber ceramic composites, and abrasives. Topics include spectroscopic analysis and evaluation of sol-gel derived materials, nuclear waste immobilization, and nuclear fuel manufacture. The fabrication of optical

fibers and protective coatings, and the corrosion and thermal stability of a variety of products are considered.(Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Sol-Gel Processes

19980016560 Environmental Protection Agency, Research Triangle Park, NC USA

Economic Impact Analysis for the Polymers and Resins 4 NESHAP Final Report

May 1996; 128p; In English

Report No.(s): PB96-181250; EPA/452/R-96/009; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

An economic analysis of the industries affected by the Polymers and Resins IV National Emissions Standard for Hazardous Air Pollutants (NESHAP) was completed in support of this promulgated standard. The industries for which economic impacts were computed for the following seven source categories or thermoplastic resin industries: styrene acrylonitrile, methyl methacrylate butadiene styrene, polyethylene terephthalate, acrylonitrile-butadiene styrene, methyl methacrylate acrylonitrile butadiene styrene, polystyrene, and nitrile resins. Several types of economic impacts, among them product price changes, output changes, job impacts, and effects on foreign trade, were computed for the selected regulatory alternatives.

NTIS

Thermoplastic Resins; Economic Impact; Air Pollution; Pollution Control; Resins; Economic Analysis; Polyethylene Terephthalate

19980016564 Ohio State Univ., Dept. of Physics, Columbus, OH USA

Spatially and Temporally Resolved Emission from Aggregates in Conjugated Polymers

Blatchford, J. W., Ohio State Univ., USA; Gustafson, T. L., Ohio State Univ., USA; Epstein, A. J., Ohio State Univ., USA; Vandembout, D. A., Ohio State Univ., USA; Kerimo, J., Ohio State Univ., USA; Sep. 20, 1997; 16p; In English

Contract(s)/Grant(s): N00014-95-I-0302; N00014-92-J-1369

Report No.(s): AD-A330160; P274; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

We present results of new, time-resolved and spatially resolved spectroscopic studies of emission and absorption in a model conjugated polymer, poly (p-pyridyl vinylene) (PPyV). The redshifted film spectra suggest the formation of aggregated regions. The approx. 4x reduction in emission efficiency in films vs. solution is attributed to a longer radiative lifetime for aggregate excitons, as is evidenced by time-resolved fluorescence measurements. We present the first direct optical imaging of aggregates in a conjugated polymer via near-field scanning optical microscopy (NSOM). The aggregate emission and absorption are found to be localized to partially aligned regions of the film approx. 200 nm in size.

DTIC

Aggregates; Conjugation; Imaging Techniques; Microscopy; Radiative Lifetime; Red Shift

19980016621 NERAC, Inc., Tolland, CT USA

Reactive Ion Etching and Reactive Sputter Etching. (Latest Citations from the INSPEC Database)

Nov. 1995; In English; Page count unavailable.

Report No.(s): PB96-855275; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning techniques and applications of reactive ion and sputter etching. Applications include integrated circuit manufacture, semiconductor technology, and surface acoustic wave devices. Etching ion sources, processes, damage, contamination, compatibility, and characteristics are discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Sputtering; Etching

19980016629 NERAC, Inc., Tolland, CT USA

Thixotropy. (Latest citations from the Rubber and Plastics Research Association Database)

Apr. 1996; In English; Page count unavailable.

Report No.(s): PB96-867718; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning thixotropic agents, additives, and stabilizers for plastics and elastomers. Thixotropic paints, coatings, and sealants are discussed. When a shear force is applied to these materials, they flow without dripping

or running. The effects of surface treatment, mechanical stresses, polymerization, and particle size on thixotropic materials are presented.

NTIS

Elastomers; Paints; Plastics; Polymerization; Rubber; Sealers; Surface Treatment; Thixotropy

19980016630 NERAC, Inc., Tolland, CT USA

Thick Films: Electronic Applications. (Latest citations from the Aerospace Database)

Apr. 1996; In English; Page count unavailable.

Report No.(s): PB96-868088; NASA-TM-96-206733; NAS 1.15:206733; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, development, fabrication, and evaluation of thick film electronic devices. Thick film solar cells, thick films for radiation conduction, deposition processes, conductive inks are among the topics discussed. Applications in military and civilian avionics are examined.

NTIS

Bibliographies; Deposition; Solar Cells; Thick Films

19980016638 NERAC, Inc., Tolland, CT USA

Ceramics Technology: Automotive Gas Turbine Engine Component Applications (Latest Citations from the Energy Science and Technology Database)

Apr. 1996; In English; Page count unavailable

Report No.(s): PB96-869136; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development and evaluation of ceramic materials for use in automotive gas turbine components. Citations discuss the design, fabrication, and testing of rotary regenerators, turbine rotors, blades, stators, combustion chambers, heat exchangers, nozzles, and seals. References to high-strength ceramic materials, thermodynamic properties, thermal efficiency, and environmental effects are included.

NTIS

Ceramics; Combustion Chambers; Energy Technology; Environment Effects; Gas Turbine Engines; Heat Exchangers; Regenerators; Research and Development; Thermodynamic Efficiency

19980016640 National Inst. of Standards and Technology, Gaithersburg, MD USA

Survey of Standards for the U.S. Fiber/Textile/Apparel Industry

Pawlak, C. G., National Inst. of Standards and Technology, USA; Apr. 1996; 94p; In English

Report No.(s): PB96-193792; NISTIR-5823; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The report documents a survey of standards relevant to the U.S. Fiber/Textile/Apparel (FTA) industry. The standards are discussed in four main groups - integration standards, test methods, quality standards, and standard reference data and materials. The Appendix of the report lists the titles of all standards found, grouped together by the organization responsible for them. Those organizations are also listed along with contact information for them. The report attempts to bring together useful information concerning FTA standards as a starting point to support the industry in intelligently planning future standards' development efforts.

NTIS

Textiles; Standards

19980016655 NERAC, Inc., Tolland, CT USA

Ion Beam Sputtering. (Latest Citations from the Ei Compendex*Plus Database)

Nov. 1995; In English; Page count unavailable.

Report No.(s): PB96-855234; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development and applications of ion beam sputtering technology. Topics include sputter deposition of films, evaluation analysis of sputtered materials, ion beam sources, surface modification and texturing, and protective and optical coatings. Methods of sputtering semiconductor materials and silicon compounds are presented.

Ion beam sputtering techniques examined include reactive, focused, neutral, and double ion beam types. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Ion Beams; Sputtering

19980016664 Technische Univ., Delft, Netherlands

Interphases in Zirconium Silicate Filled High Density Polyethylene and Polypropylene *Grenslagen in Hoge Dichtheid Polyetheen en Polypropreen Gevuld met Zirconiumsilicaat*

Levering, A. W., Technische Univ., Netherlands; Sep. 11, 1995; 173p; In English

Report No.(s): PB96-127840; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This thesis describes the study of the replacement of yellow cadmium pigments by a zirconium silicate pigment. The main problem with the incorporation of the inorganic zircon pigment in organic polymers, like polyethylene and polypropylene, is the deterioration of the (mechanical) properties of the polymer. In general, the decline of mechanical properties is the result of the incompatibility between the two materials. Therefore it is important to modify the surface of the pigment so that it becomes compatible with the polymer. However, not all surface modifications are suitable to obtain composites with good mechanical properties. In this study the influence of different types of surface modifications on the mechanical properties has been investigated.

NTIS

Mechanical Properties; Polyethylenes; Polypropylene; Silicates; Zirconium

19980016667 NERAC, Inc., Tolland, CT USA

Solventless Coatings. (Latest citations from World Surface Coatings Abstracts)

Apr. 1996; In English; Page count unavailable.

Report No.(s): PB96-867726; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning solventless coatings. Compositions, applications, and citations of selected patents are included. Silicone and polyurethane solventless coatings are highlighted. Use in protective coatings, electrical insulation, varnish, beverage container coatings, and paper coatings is examined. Reduction of pollution from solvents by using solventless coatings is briefly considered.

NTIS

Electrical Insulation; Polyurethane Resins; Protective Coatings; Silicones; Solvents

19980016671 NERAC, Inc., Tolland, CT USA

Tetrafluoroethylene (Teflon) Polymerization. Chemical Analysis: Latest Citations from the Rubber and Plastics Research Association Database

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-862909; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the polymerization of tetrafluoroethylene. Copolymerization, radiation induced grafting, molecular structure, viscoelasticity, thermal characteristics, and low temperature polymerization are among the topics discussed. Applications of tetrafluoroethylene polymers in protective films, membranes, and bearings are briefly considered.

NTIS

Chemical Analysis; Copolymerization; Low Temperature; Molecular Structure; Plastics; Polymerization; Teflon (Trademark); Viscoelasticity

19980016674 NERAC, Inc., Tolland, CT USA

High Temperature Lubricants and Oils. (Latest Citations from the NTIS Bibliographic Database)

Nov. 1995; In English; Page count unavailable.

Report No.(s): PB96-855291; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the chemical composition and properties of high temperature lubricants, oils, and hydraulic fluids. The testing and uses of these lubricants are discussed. The performance of solid, liquid and dry lubricants

are evaluated. Also discussed are self-lubricating materials used in bearings and coatings. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; High Temperature Lubricants; Oils

19980016681 NERAC, Inc., Tolland, CT USA

Chemical Vapor Deposition. (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English

Report No.(s): PB96-864897; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning chemical vapor deposition of carbon, carbides, ceramics, metals, and glasses. Applications include optical coatings, semiconducting films, laser materials, solar cells, composite fabrication, and nuclear reactor material fabrication. Included are the physical, mechanical, and chemical properties of these coatings.

NTIS

Carbides; Chemical Properties; Fabrication; Laser Materials; Mechanical Properties; Nuclear Reactors; Reactor Materials; Semiconducting Films; Ceramics

19980016706 NERAC, Inc., Tolland, CT USA

Surface Finishing of Ceramics: Latest Citations from Engineered Materials Abstracts

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-862776; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning finishes used on the surfaces of ceramics. Citations focus on surface treatments, vapor depositions, and high temperature coatings. Topics include coating of ceramic powders and fibers, grinding, and polishing.

NTIS

Ceramics; Coating; Deposition; High Temperature; Powder (Particles); Surface Finishing; Surface Treatment

19980016711 NERAC, Inc., Tolland, CT USA

Polymers in Vibration Damping and Soundproofing. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Nov. 1995; In English; Page count unavailable.

Report No.(s): PB96-855218; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning synthetic resin compositions which demonstrate vibration damping and soundproofing properties. Thermoplastic and thermosetting plastics and elastomers are discussed relative to fillers, modifiers, reinforcing agents, molding processes, laminating structures, and coating compositions. Aeronautics, sporting goods, manufacturing, and electrical engineering are among the applications discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Synthetic Resins; Composite Materials; Vibration Damping; Sound Transmission; Polymers

19980016789 Etablissement Technique Central de l'Armement, Centre de Recherches et d'Etudes d'Arcueil, Arcueil, France

Impact Behaviour of Bilayer Armours

Orsini, H., Etablissement Technique Central de l'Armement, France; 1995; 10p; In English

Report No.(s): PB96-132998; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The ceramic/composite bilayer protections are probably the most efficient light armour concept so far. The first results had shown an important mass saving compare with classical monolithic solutions (armour steel or aluminium alloys), and had led Arcueil Research and Development Center (CREA) to start research and applied studies on the impact behavior of both ceramic and composite materials and of the global structure. Several ceramics, such as SiC, TiB₂, B₄C and others, have been ranked against the AP 12.7 mm projectile. The optimization approach to improve ceramic ballistic performances is presented. Several composites

have also been studied. In parallel, PhD works are carried out to determine the dynamic behavior laws of ceramics and composites. The aim of these works is to build up a model which could able one to design a bilayer armor against a given threat.

NTIS

Ceramics; Armor; Dynamic Characteristics; Titanium Borides

19980016793 Stone and Webster Engineering Corp., Houston, TX USA

Evaluation of Ceramic Tubes, Joints, and Seals for High Pressure Heat Exchange Systems *Final Report, Sep. 1991 - Feb. 1994*

Williams, J. J., Stone and Webster Engineering Corp., USA; Gondolfe, J. M., Stone and Webster Engineering Corp., USA; Mar. 1996; 55p; In English

Contract(s)/Grant(s): GRI-5090-298-2096

Report No.(s): PB96-178421; GRI-94/0279-Rev; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Silicon Carbide containing ceramics have been evaluated for their use as reactor tubes in a steam-methane reformer being developed by Stone & Webster. Screening tests, using ceramic coupons exposed to simulated syngas mixtures at up to 2300 F, have shown that at high temperatures, steam partial pressure is an important parameter in the extent of steam attack of the silicon carbide. However, there are operating conditions, e.g. steam partial pressure below 60 PSIA, which will minimize the extent of silicon carbide attack. Further testing of coupons, tubular shapes, and ceramic to metal joints is being conducted at Oak Ridge National laboratory and at the Center for Advanced Materials (CAM) at Pennsylvania State University.

NTIS

Ceramics; Silicon Carbides; Heat Exchangers; Metal Joints; Seals (Stoppers); High Pressure; Pipes (Tubes)

19980016810 National Inst. of Standards and Technology, Polymers Div., Gaithersburg, MD USA

Certification of the Standard Reference Material 1473a: a Low Density Polyethylene Resin

Maurey, J. R., National Inst. of Standards and Technology, USA; Blair, W. R., National Inst. of Standards and Technology, USA; Guttman, C. M., National Inst. of Standards and Technology, USA; Oct. 1995; 24p; In English

Report No.(s): PB96-128251; NISTIR-5639; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The melt flow rate of Standard Reference Material (SRM) 1473a, a polyethylene resin, was determined to be 1.17 g/10 min at 190 deg C under the load of 2.16 kg using the ASTM Method D 1238-90b. The average results from 66 determinations on samples with a standard deviation of a single measurement of 0.015 g/10 min. A small but measureable drift from the first timed extrudate to the third timed extrudate was observed.

NTIS

Flow Velocity; Loads (Forces); Standard Deviation

19980016838 Oklahoma Dept. of Transportation, Research, Development and Technology Transfer, Oklahoma City, OK USA

Bridge Steel Coatings Tolerant of Minimal Surface Preparation, Oct. 1993 - Sep. 1994

Gordon, K. L., Oklahoma Dept. of Transportation, USA; Jun. 1996; 33p; In English

Report No.(s): PB97-135552; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In 1993 and 1994, the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) initiated regulations that radically altered practices in the paint industry. Many of these measures apply to lead abatement, practices devised to eradicate lead-based paint hazards. These changes in legislation are designed to promote domestic, worker and environmental safety. The organizations that must implement these changes are finding that complying with the new rules are complicated and extremely expensive. The Oklahoma Department of Transportation (ODOT) selected seven bridges to overcoat with coating systems that meet the new standards for evaluation. The systems selected require minimal surface preparation, that is, removal of loose debris and dirt instead of the removal of an existing paint system on the steel beams, prior to application. Research, Development and Technology Transfer of ODOT monitored the application of several different paints to these bridges. An eighth bridge was cleaned using an abrasive cleaning method then coated with a lead-based paint that no longer meets the new regulations; this will be the control bridge for this study. This construction report presents the observations and application procedures of these coating systems to the above mentioned bridges with emphasis on compatibility testing, SSPC SP2, SSPC SP3 and SSPC SP6 standard cleaning methods, construction procedures, and cost analysis.

NTIS

Coatings; Steels; Lead (Metal); Paints; Pollution Control; Surface Finishing

19980016839 National Inst. of Standards and Technology, Gaithersburg, MD USA

Journal of Research of the National Institute of Standards and Technology. Special Issue: 40 Years of Entropy and the Glass Transition, Volume 102

1997; 161p; In English

Report No.(s): PB97-166003; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

Contents include the following: Configurational Entropy Approach to the Kinetics of Glasses; Entropy Theory and Glass Transition: A Test by Monte Carlo Simulation; Entropy and Fragility in Supercooling Liquids; Entropy Crises in Glasses and Random Heteropolymers; Adam-Gibbs Formulation of Enthalpy Relaxation Near the Glass Transition; Evidence for Glass and Spin-Glass Phase Transitions from the Dynamic Susceptibility; Entropy, Free Volume, and Cooperative Relaxation; Conformational Entropy Contributions to the Glass Temperature of Blends of Miscible Polymers.

NTIS

Monte Carlo Method; Phase Transformations; Supercooling; Enthalpy; Entropy

19980016868 Minnesota Univ., Center for Transportation Studies, Minneapolis, MN USA

Moisture Sensitivity in Asphalt Concrete Mixtures Final Report, 1994-1995

Stroup-Gardiner, M., Minnesota Univ., USA; Newcomb, D. E., Minnesota Univ., USA; Crow, B., Minnesota Univ., USA; Kusman, W., Minnesota Univ., USA; Wegman, D., Minnesota Univ., USA; Nov. 1995; 73p; In English

Report No.(s): PB96-162730; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The research performed for this report was intended to recommend alternative mix design procedures and parameters for evaluation of asphalt mixture sensitivity, with more of an emphasis on volumetric relationships. Three Mn/DOT projects were selected to represent the following durability issues: (1) deboning of asphalt from aggregate, (2) cohesion problems, and (3) mix design problems. Materials were obtained from these construction projects and evaluated in the laboratory. Gradations were varied from the project specifications so that mixtures with more and less asphalt were evaluated along with the project mixture. Testing included the temperature susceptibility and moisture sensitivity of the mixtures, in addition to the net adsorption test on the aggregates. The results suggested means for identifying moisture sensitivity mechanisms in mixtures during the mixture design phase, although these need to be confirmed through more extensive investigation. Aggregate mineralogy, gradation, and mixture proportioning can all play a role in improving the durability characteristics of asphalt mixtures. Recommendations are made for continued research and implementation of an improved approach to asphalt mixture design.

NTIS

Moisture; Sensitivity; Asphalt; Concretes; Evaluation; Pavements; Adsorption

19980016880 Oklahoma Dept. of Transportation, Research, Development and Technology Transfer, Oklahoma City, OK USA

Silane Penetrating Waterproofing Sealers Final Report, Apr. 1989 - Apr. 1993

Gordon, K. L., Oklahoma Dept. of Transportation, USA; Nov. 1996; 41p; In English

Report No.(s): PB97-135503; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Oklahoma Department of Transportation has been applying silane penetrating water sealers since the late 1970's to prevent the intrusion of chloride contaminated water in bridge decks. This contaminated moisture causes severe corrosion in reinforcing steel and costly damage to the bridge decks. To determine how silanes perform in the field, Research, Development and Technology transfer established an evaluation plan. The primary objectives of this study were to monitor the chloride ion content and corrosion activity in the top mat of reinforcing steel and to evaluate the performance of Portland cement penetrating sealers over five years. Ten bridges treated with silanes were selected for this study along with one untreated bridge. This report discusses the findings as they pertain to these objectives.

NTIS

Corrosion Prevention; Silanes; Bridges (Structures); Sealing; Waterproofing

28
PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; their storage and handling procedures; and aircraft fuels. For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 44 Energy Production and Conversion.

19980013939 Army Research Lab., Weapons and Materials Research Directorate, Aberdeen Proving Ground, MD USA
The Application of Electrothermal-Chemical (ETC) Propulsion Concepts to Reduce Propelling Charge Temperature Sensitivity *Final Report, Jun. 1996 - Jun. 1997*

Oberle, William, Army Research Lab., USA; White, Kevin, Army Research Lab., USA; Sep. 1997; 52p; In English
Contract(s)/Grant(s): DA Proj. 1L1-62618-AH-75

Report No.(s): AD-A330944; ARL-TR-1509; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The concept of the propelling charge temperature coefficient and its impact on gun performance is explored. Ballistic factors, in addition to the propellant burn rate dependence on initial temperature that often increases the magnitude of the propelling charge temperature coefficient, are identified and discussed. Techniques for moderating the effects of the propelling charge temperature coefficient are presented, with special emphasis on the utilization of electrothermal- chemical (ETC) concepts.

DTIC

Chemical Propulsion; Temperature Dependence; Temperature Effects

19980014459 Southwest Research Inst., San Antonio, TX USA

Biodiesel Fuel Technology for Military Application *Interim Report, Jul. 1994 - May 1996*

Frame, Edwin A., Southwest Research Inst., USA; Bessee, Gary B., Southwest Research Inst., USA; Marbach, Howard W., Jr, Southwest Research Inst., USA; Dec. 1997; 308p; In English

Contract(s)/Grant(s): DAAK70-92-C-0059

Report No.(s): AD-A332922; TFLRF-317; No Copyright; Avail: CASI; A14, Hardcopy; A03, Microfiche

This program addressed the effects of biodiesel (methyl soyate) and blends of biodiesel with petrofuels on fuel system component and material compatibility, fuel storage stability, and fuel lubricity. Biodiesel was found to have excellent lubricity properties and was effective at 1 volume percent (vol %) blend in improving the lubricity of Jet A-1 fuel. The following potential problem areas associated with methyl soyate use were identified: storage stability, compatibility with some metals, and compatibility with nitrile elastomers.

DTIC

Methyl Compounds; Jet Engine Fuels; Fuel Systems

19980014567 Technische Univ., Delft, Netherlands

FCC Catalyst Testing in a Novel Laboratory Riser Reactor

Helmsing, M. P., Technische Univ., Netherlands; Jun. 27, 1996; 122p; In English

Report No.(s): PB97-157366; Copyright Waived; Avail: CASI; A06, Hardcopy; A02, Microfiche

The product demand from a refinery is changing to lighter products such as gasoline and diesel fuels. Therefore, oil conversion processes such as fluid catalytic cracking (FCC) have a major impact on the profitability of a refinery. Modest improvements in all aspects of the FCC process can be very valuable. A general description of the process and catalyst is given. Different designs and future trends are discussed. The optimal catalyst choice is one of the important means to keep or enhance the profitability of the FCC process. Catalyst testing plays a key role in obtaining data and establishing the performance. Reactor selection in catalyst testing is a crucial step in the collection of useful information. An overview is given of the current state of the art of FCC catalyst testing including kinetic modelling. This chapter is concluded with the scope of this thesis.

NTIS

Catalysts; Cracking (Chemical Engineering); Diesel Fuels; Trends

19980015140 EA Engineering Science and Technology, Inc., Silver Spring, MD USA

Alternative Fuels for Vehicles Fleet Demonstration Program, Volume 1, Summary

Bechtold, R. L., EA Engineering Science and Technology, Inc., USA; Mar. 1997; 103p; In English

Report No.(s): PB97-159396; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Volume 1 of this report provides: (1) information about the purpose and scope of the Alternative Fuels for Vehicles Fleet Demonstration Program (AFV-FDP); (2) summary of AFV-FDP findings, organized on the basis of vehicle type and fuel type; (3) a

short review of the status of AFV technology developments, including examples of companies in New York State that are active in developing AFVs and AFV components; and (4) a brief overview of AFV deployment status in New York State.

NTIS

Automobile Fuels; Energy Conservation; Hydrocarbon Fuels

19980015159 MEGA Energy Technology, Vaesterhaninge, Sweden

Challenges in Propellants and Combustion: 100 Years after Nobel

Kuo, Kenneth K., Editor, MEGA Energy Technology, Sweden; Brill, Thomas P., MEGA Energy Technology, Sweden; Pesce-Rodriguez, Rose A., MEGA Energy Technology, Sweden; Mitchell, Alexander R., MEGA Energy Technology, Sweden; Covino, Josephine, MEGA Energy Technology, Sweden; Chan, S. K., MEGA Energy Technology, Sweden; Peretz, Arie, MEGA Energy Technology, Sweden; Gunners, Nils-Erik, MEGA Energy Technology, Sweden; Thynell, Stefan T., MEGA Energy Technology, Sweden; Chan, S. H., MEGA Energy Technology, Sweden; Sep. 05, 1997; 1196p; In English

Contract(s)/Grant(s): F61708-96-W-0125

Report No.(s): AD-A329686; EOARD-CSP-96-1027; ISBN 1-56700-092-4; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

The Final Proceedings for the Fourth InterNational Symposium on Special Topics in Chemical Propulsion 4-ISICP, 27 May 1996 - 31 May 1996. The Topics covered include: chemical kinetics of propellant combustion, environmental considerations in combustion of solid and liquid propellants, commercial application in the combustion of energetic materials, effective utilization of propellants, combustion diagnostics, and recycling.

DTIC

Propellant Combustion; Chemical Propulsion; Combustion Chemistry; Solid Propellants; Reaction Kinetics; Liquid Rocket Propellants

19980015194 SRI InterNational Corp., Menlo Park, CA USA

Chemical Mechanisms of Shock Initiation of NTO Final Report, 15 Jun. 1994 - 14 Jun. 1997

McMillen, D. F., SRI InterNational Corp., USA; Erlich, David C., SRI InterNational Corp., USA; He, Chun, SRI InterNational Corp., USA; Becker, Christopher H., SRI InterNational Corp., USA; Shockey, Donald A., SRI InterNational Corp., USA; Oct. 1997; 143p; In English

Contract(s)/Grant(s): F49620-94-C-0055; AF Proj. 2303

Report No.(s): AD-A331299; SRI-MP-109; AFOSR-TR-97-0574; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

A powerful analytical tool has been developed for in-situ, real-time measurement of the thermally and mechanically induced transient decomposition processes of energetic materials, and has been applied to the new, insensitive high explosive, Nitro-1,2,4-Triazol-5-One (NTO). Modification of the vacuum chamber of a laser-desorption mass spectrometry apparatus has enabled us to perform simple-shear and compressive fracture of pressed pellets directly beneath the sampling region: fragments spontaneously emitted from fractured NTO pellets are measured by Single-Photon Ionization (SPI) time-of-flight mass spectrometry. The fracture-induced fragments of NTO are dominated by a single peak, m/z 99, which is completely absent in either the thermal- or laser-desorption spectra obtained in the same apparatus. This difference suggests that under the marginal stress of sub-critical mechanical fracture, intermediates of mass 100 and/or 101 are diverted to the closed-shell, relatively stable species at mass 99, which then tends to accumulate, rather than going on to produce a next generation of unstable intermediates at m/z 85, 71, and 43. Thus, in its first use, this combination of techniques has enabled identification of intermediates not previously observed in NTO decomposition and allowed us to propose a reasonable sequence of reactions that involves all of these intermediates, reconciles a substantial portion of previous slow thermal decomposition data, and potentially explains the initiation insensitivity of NTO as resulting from diversion to a relatively stable 'dead-end' species.

DTIC

Explosives; Numerical Analysis; Technologies; Mass Spectroscopy; Thermal Decomposition; Shock Simulators; Sensitivity

19980015241 SRI InterNational Corp., Molecular Physics Lab., Menlo Park, CA USA

Energetic Species in Condensed Oxygen/Ozone Final Report, 15 Jun. 1994 - 14 Jun. 1997

Copeland, Richard A., SRI InterNational Corp., USA; Helm, Hanspeter, SRI InterNational Corp., USA; Dyer, Mark, SRI InterNational Corp., USA; Oct. 27, 1997; 20p; In English

Contract(s)/Grant(s): F49620-94-C-0056; AF Proj. 2303

Report No.(s): AD-A331284; SRI-MP-97-127; AFOSR-TR-97-0575; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The goal of the High Energy Density Matter Program of the Air Force, the development of a rocket propellant that significantly improves on the performance of the conventional liquid hydrogen/liquid oxygen rocket propellant, is an ambitious and important undertaking. The 'next generation' propellant must be energetic, economical, and safe from both an engineering and environmental standpoint. These properties are often mutually exclusive and a balance of availability and ease of use must be struck. Cryogenic solids, specifically 'energized' solid hydrogen and/or solid oxygen, have been a n area of study for years. Using cryogenic solids, the increase in density gives rise to a modest increase in theoretical performance, but more importantly, cryogenic solids provide a low-temperature environment required for the stable trapping of energetic species. Obtaining large concentrations of energetic species even in this low temperature environment has proven difficult. One system where ton quantities of the reactant species can be manufactured is a system using a mixture of solid ozone/oxygen; this mixture is the focus of the research on this project.

DTIC

Cryogenics; Hydrogen; Liquid Hydrogen; Liquid Oxygen; Low Temperature Environments; Propellants; Rocket Propellants; Solid Cryogenics; Solidified Gases

19980016613 Conservation of Clean Air and Water-Europe, Brussels, Belgium

Alternative Fuels in the Automotive Market

Hutcheson, R. C., Conservation of Clean Air and Water-Europe, Belgium; Oct. 1995; 84p; In English

Report No.(s): PB96-127816; CONCAWE-2/95; Copyright Waived; Avail: CASI; A05, Hardcopy; A01, Microfiche

The report reviews, in a European context, the emissions, economic and CO2 advantages (or disadvantages) of alternative road transport fuels when compared with conventional petroleum derived fuels. The report is structured around two broad classifications of the alternatives: gaseous fuels (from non-renewable sources); and bio-fuels (derived from renewable agricultural produce). Methanol, which does not fit comfortably in either classification, is treated in a separate section.

NTIS

Automobiles; Carbon Dioxide; Classifications; Gaseous Fuels; Methyl Alcohol

29

MATERIALS PROCESSING

Includes space-based development of products and processes for commercial applications. For biological materials see 55 Space Biology.

19980015756 NASA Kennedy Space Center, Cocoa Beach, FL USA

Microbial Cellulose Assembly in microficherogravity Final Report

Brown, R. Malcolm, Jr., NASA Kennedy Space Center, USA; [1998]; 16p; In English

Contract(s)/Grant(s): NAG10-143

Report No.(s): NASA/CR-1998-206992; NAS 1.26:206992; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Based on evidence indicating a possible correlation between hypo-gravity conditions and alteration of cellulose production by the gram negative bacterium, *Acetobacter xylinum*, a ground-based study for a possible long term Space Shuttle flight has been conducted. The proposed experiment for *A. xylinum* aboard the Shuttle is the BRIC (Biological Research in a Canister), a metal container containing spaces for nine Petri plates. Using a common experimental design, the cellulose production capability as well as the survivability of the *A. xylinum* strains NQ5 and AY201 have been described. It should now be possible to use the BRIC for the first long term microgravity experiments involving the biosynthesis of cellulose.

Author

Cellulose; Biosynthesis; Ground Tests; Bacteria

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

19980012526 Technical Univ. of Budapest, Hungary

Periodica Polytechnica, Mechanical Engineering, Volume 39, Papers from Institute of Machine Design *Quarterly Report*

Kollar, I., Technical Univ. of Budapest, Hungary; 1995; 91p; In English; In German

Report No.(s): PB96-175013; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

Contents include the following: Implementation and Uniform Management of modelling Entities in a Massively Feature-object Oriented Advanced CAD Environment; Feature Based Geometric Modelling and Analysis of Multibody Mechanical System Behaviour; and Non Linear Finite Element Analysis of the Contact, Strain and Stress States of a Bolt - Nut - Washer - Compressed Sheet Joint System.

NTIS

Computer Aided Design; Management; Models; Strain Rate; Stress Analysis

19980012710 Olin Aerospace Co., Redmond, WA USA

Advanced Fire Suppression Technology (AFST) Research and Development Program *Final Report, 31 Aug. 1993 - 28 Apr. 1997*

Wilson, M. A., Olin Aerospace Co., USA; Moran, J. D., Olin Aerospace Co., USA; Apr. 1997; 33p; In English

Contract(s)/Grant(s): F33615-93-C-3404; AF Proj. 2402

Report No.(s): AD-A329985; WL-TR-97-3092; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Halon 1301 has been widely used in aircraft fire suppression systems because of its ability to efficiently extinguish fires. Unfortunately, halon production was banned in 1994 because it is an ozone depleting substance. The ban on halon production has created a need for alternative fire suppression technologies in both the military and civilian aircraft industries. Solid Propellant Gas Generators (SPGG) is a viable alternative to halon for in-flight fire suppression. SPGG relies on the controlled burning of solid reactants to produce inert gases (H₂O, CO₂, and N₂) that can be used for fire suppression and it was developed from technology originally applied in automotive airbag devices. The testing discussed in this report is based on the results and conclusions derived from previous testing. SPGG devices and hybrid systems (SPGG used to pressurize a liquid fire extinguishant such as H₂O or FM200) were tested against three fire conditions. The test results revealed that SPGG and hybrid systems were effective in extinguishing the fire conditions, but performance was slightly worse than HFC-125 on an agent mass comparison. Further testing and development of the gas generator is required before it is fully understood and can be considered mature.

DTIC

Fire Extinguishers; Research and Development; Solid Propellants; Gas Generators; Aircraft Industry

19980014446 NERAC, Inc., Tolland, CT USA

Heat Treating Atmospheres (Latest Citations from METADEX)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863196; Copyright Waived; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning atmospheres suitable for annealing and heat treating ferrous and non-ferrous metals and alloys. Citations discuss shielding gases and mixtures of shielding and reactive gases to produce or prevent specific changes in materials. Different types of controlled atmospheres and their generation methods are described, and economic considerations are included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Ferrous Metals; Nonferrous Metals; Annealing; Heat Treatment

19980014569 Texas Univ., Center for Transportation Research, Austin, TX USA

Alternative Methods by Which to Control Bridge Column Corrosion among New and Existing Bridges *Final Report*

Pankey, C., Texas Univ., USA; Morris, J., Texas Univ., USA; Fowler, D. W., Texas Univ., USA; May 1996; 48p; In English

Contract(s)/Grant(s): Research Proj. 0-1600

Report No.(s): PB97-191126; CTR-1600-1F; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Increasingly, the corrosion of embedded reinforcing steel has been identified as a leading cause of structural damage and failure associated with bridges in Texas. In particular, bridge corrosion refers to the scaling, cracking, and delamination of the concrete. This document presents the results of a literature review conducted by the researchers to identify alternative methods by

which to control bridge column corrosion among new and existing bridges. Specifically, the researchers investigated the literature on concrete modifications and reinforcement bar treatments. In terms of implementation, the findings of this review could be used to identify ways of reducing the corrosion of embedded reinforcing steel that can cause structural damage to Texas bridges.

NTIS

Bridges (Structures); Reinforcement (Structures); Steels; Structural Failure

19980014804 NERAC, Inc., Tolland, CT USA

Lunar Base: Design and Construction. (Latest Citations from the Ei Compendex*Plus Database)

Mar. 1996; In English

Report No.(s): PB96-862644; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning plans for the development of a lunar (moon) base. Topics include life support, power options, and biotechnology aspects. Lunar base construction, materials, and design methods are discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Lunar Bases; Bibliographies

19980015121 National Inst. of Standards and Technology, Building and Fire research Lab., Gaithersburg, MD USA

Wind and Seismic Effects: Proceedings of the 28th Joint Meeting of the US-Japan Cooperative Program in Natural Resources Panel on Wind and Seismic Effects

Raufaste, N. J., National Inst. of Standards and Technology, USA; Aug. 1996; 594p; In English; 28th; Wind and Seismic Effects, 14-17 May 1996, Gaithersburg, MD, USA

Report No.(s): PB97-104376; NIST/SP-904; No Copyright; Avail: CASI; A25, Hardcopy; A06, Microfiche

This publication is the Proceedings of the 28th Joint Meeting of the U.S.-Japan Panel on Wind and Seismic Effects. The Proceedings include the program, list of members, panel resolutions, task committee reports, and the 46 technical papers written for this joint meeting. The papers were presented within five themes: (1) Storm Surge and Tsunamis, (2) Earthquake Engineering, (3) Joint Cooperative Research Program, (4) Wind Engineering, and (5) Summaries of Task Committee Workshop Reports (oral presentations only).

NTIS

Conferences; Wind Effects; Structural Engineering; Dynamic Structural Analysis; Geotechnical Engineering; Seismology; Earthquakes

19980015129 Naval Facilities Engineering Service Center, Port Hueneme, CA USA

Local/Global Approach to Nonlinear Simulation of Compliant Marine Structures Final Report, 1 Oct. 1992 - 15 Dec. 1996

Zueck, Robert F., Naval Facilities Engineering Service Center, USA; Jun. 1997; 129p; In English

Report No.(s): AD-A330629; NFESC-TR-2073-OCN; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This report presents reliable techniques for modeling extremely compliant structures. The research focuses on severe geometric nonlinearities associated with very large displacements and rotations. The solution requires two major modeling improvements: formulation of well-conditioned finite elements and development of specific control strategies for nonlinear step-by-step solution. Inherent in the physics of the structure, natural events condition the new finite elements. Associated event control directs the numerical solution to adhere closely to the true nonlinear structural response path. The numerical strategies are a simple extension of the trapezoidal rule for time integration and Newton iteration for nonlinear step-by-step solution. The result is extremely fast, efficient, and stable nonlinear structural simulation. A high level of computational robustness is essential for development of fully nonlinear substructured models. A local/global approach allows each substructure to have its own specialized local submodel and its own associated local solution strategy. A global model then integrates all the super-element representations of each diverse submodel. The local/global framework allows the nonlinear solution strategies to efficiently concentrate computational power where and when needed among the submodels. Code development and test problems focus primarily on compliant marine structures, where the need for robust, highly nonlinear simulation is so great.

DTIC

Elastic Properties; Finite Element Method

19980015174 Rhode Island Dept. of Transportation, Research Technology Development Div., Providence, RI USA
Durability of Penetrant-Class Sealer-Coated Air-Entrained Concrete Subjected to Freeze/Thaw Final Report, Jun. 1994 - Jul. 1996

Sock, M. D., Rhode Island Dept. of Transportation, USA; Feb. 1997; 71p; In English
Report No.(s): PB97-159602; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Previous tests conducted at the Rhode Island Department of Transportation (RIDOT) comparing the effectiveness of various coating treatments for concrete had indicated a possible detrimental effect of penetrant sealers on concrete freeze/thaw durability. A test was specifically designed to study the effects of penetrant sealers on the freeze/thaw (F/T) durability of air-entrained concrete. Three sealer-coated specimen groups were tested in the study and gave performance comparable to that of the uncoated controls, with only a slight relative change in the resilient modulus as a result of exposure to freeze/thaw.

NTIS

Bridges (Structures); Durability; Concretes; Coatings; Sealers; Performance Tests

19980015228 NERAC, Inc., Tolland, CT USA

Diamond Turning: Machine Development and Optical Mirror Fabrication. (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864160; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development of Diamond Turning Machines (DTM) and processes, which are used in the fabrication of optical devices. Diamond turning is a rapidly developing technology for high precision, high quality, and cost effective fabrication of optical reflectors, including high power laser mirrors. Topics include optical evaluations and characteristics of diamond turned surfaces, high surface accuracy with numerically controlled DTM, diamond turned metal mirrors, single point DTM, size capabilities of DTM, and x-ray DTM systems. Diamond turning research activities at several National laboratories and cosponsorships with the Department of Defense (DOD) and Department of Energy (DOE) are presented. Computer aided design and manufacturing of optical equipment is excluded and examined in a separate bibliography.

NTIS

Bibliographies; Diamonds; Product Development; Fabrication; Technologies

19980015354 Pennsylvania Dept. of Transportation, Bureau of Construction and Materials, Harrisburg, PA USA

Anti-Graffiti Systems and Cleaners Final Report, Jun. 1990 - Jun. 1997

Kuniega, D., Pennsylvania Dept. of Transportation, USA; Davidson, R., Pennsylvania Dept. of Transportation, USA; Bartoski, T. A., Pennsylvania Dept. of Transportation, USA; Jun. 1997; 52p; In English

Report No.(s): PB97-183255; PA-96-006-89-058; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The purpose of the report was to evaluate the effectiveness of anti-graffiti systems and cleaners. The project was performed along U.S. Route 1 on grapestake sound barriers and in a laboratory on concrete blocks to see if there would be any correlation to the study done in the field. The cleaners were evaluated on the following criteria: ease of cleaning, deterioration of the coating, and the effectiveness of the removal of the graffiti. The coating systems were evaluated on the effects of weathering, constant cleaning, ultra-violet rays, and their adhesion to the sound barrier. Based on the evaluation and data from the study, it can be concluded that a majority of the coating systems tested passed our evaluations. of the graffiti cleaners, only four are recommended, AGP-Wipe A Way, Ameron-Amerase, Coatings for Industry - GFI 739 Graffiti Remover, and Carboline - Surface Cleaner No. 3. The laboratory tests, however, were inconclusive in determining how effective the systems would be in the field, but it can serve as a good screen for individual products.

NTIS

Acoustic Velocity; Deterioration; Industries; Weathering

19980015617 Texas Univ., Center for Transportation Research, Austin, TX USA

Experimental Design, Planning, and Analysis of Pavement Test Sections for the Texas Mobile Load Simulator Final Report

Pilson, C. C., Texas Univ., USA; Hudson, W. R., Texas Univ., USA; Anderson, V., Texas Univ., USA; Dec. 1995; 124p; In English
Report No.(s): PB96-181102; CTR-7-2921-1F; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The project was undertaken to assist with the design, planning, and analysis of pavement test sections for future use with the newly developed Texas Mobile Load Simulator. It specifically addresses the type, number, and positions for strain and pressure sensors in test sections. In the project, the authors conducted two full factorial experiments on test sections built by the Texas Department of Transportation (TXDOT) in Victoria, Texas. Using a conventional dump truck, they collected data from various

makes of strain and pressure sensors embedded in the pavement at different positions and depths. These data were analyzed to determine variability characteristics by constructing a quadratic response surface model estimated by least squares regression. This analysis was then used to assess precision of measurements, with the model used to compare measured values with theoretically predicted values for an assessment of accuracy. In this way, conclusions with regard to the make number, and position of sensors for future experimental test sections could be drawn. The authors found that HBM DA3 strain gauges and Kulite pressure cells gave the most precise and most accurate results; these are therefore recommended for future experiments. It is recommended that between 9 and 17 strain and pressure sensors be used per section. While HBM sensors appear to give reasonably accurate results, it appears that other types of strain gauge tested adequately used measured strain.

NTIS

Pavements; Simulators; Traffic

19980015622 Maryland Univ., Nuclear Engineering Program, College Park, MD USA

Evaluation of the HDR Fire Test Data and Accompanying Computational Activities with Conclusion from Present Code Capabilities, Volume 1, Test Series Description for T51 Gas Fire Test Series

Floyd, J., Maryland Univ., USA; Wolf, L., Maryland Univ., USA; Krawiec, J., Maryland Univ., USA; Oct. 1997; 124p; In English Report No.(s): PB98-110216; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Volume covers the following aspects of the HDR fire experiments: Section 1 provides an overall introduction the HDR test facility and especially the containment building layout. Section 2 gives a detailed account for the compartment layouts for the propane gas burner and wood crib experiments. Section 3 describes the objectives, requirements, and functional principles of the instrumentation applied during the test series and documents the positions of all sensors used in both tabular and graphical form. Section 4 briefly summarizes the common test procedure used for executing every experiment. Section 5 provides an overview of major experimental results of the gas burner tests in three subsections. The concluding Section 6 addresses numerous aspects of potential contributions of the gas burner experiments towards the validation of zone model codes such as CFAST containment system codes such as GOTHIC, and CFD codes such as NIST-LES.

NTIS

Thermophysical Properties; Combustion Physics; Evaluation; Data Processing; Computation; Fires; Examination

19980015636 NERAC, Inc., Tolland, CT USA

Statistical and Computerized Process Control in Heat Treating. (Latest Citations from METADEX)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864186; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the application of statistical and computerized process control to heat treatment used in the manufacture of materials and parts. Citations address control of induction, gas, laser, and fluidized bed heat processes. Also considered is the control of various quenching methods and atmospheres. Continuous annealing, gas carburizing, and case hardening are considered. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Heat Treatment; Numerical Control; Process Control (Industry)

19980015651 Army Cold Regions Research and Engineering Lab., Hanover, NH USA

Increasing Cold Weather Masonry Construction Productivity

Korhonen, Charles J., Army Cold Regions Research and Engineering Lab., USA; Thomas, Robert D., Army Cold Regions Research and Engineering Lab., USA; Cortez, Edel R., Army Cold Regions Research and Engineering Lab., USA; Aug. 1997; 57p; In English

Report No.(s): AD-A330536; CRREL-SR-97-16; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The thermal protection requirements for cold weather masonry, as established in current industry specifications, were evaluated. Experiments were conducted to define the most relevant factors in the process of freezing of newly placed mortar. The effect of unit absorption on the moisture content of mortar during the first hours after assembly was assessed. Correlations of moisture content with time were developed for mortar in contact with masonry units. Frost immunity thresholds in terms of mortar moisture content and in terms of maturity were determined. The test results provided the basis for new proposed guidance on when fresh mortar can be safely exposed to freezing temperatures. Test methods for evaluation of the freeze thaw resistance of masonry units were evaluated. A new test was proposed and adopted by ASTM as a new standard test for the freeze thaw testing of masonry units. In addition, several chemicals were evaluated for their potential as antifreeze admixtures for masonry mortar. Antifreeze

admixtures were first developed for use in concrete, but the practicality of using antifreeze admixtures in masonry mortars was demonstrated in a field application in microfichehigan during the winter.

DTIC

Cold Weather; Concretes; Construction; Correlation; Industries; Masonry; Moisture Content; Thermal Protection

19980015922 Connecticut Univ., Dept. of Civil and Environmental Engineering, Storrs, CT USA

New Additive for Improved Durability of Concrete and Prevention of Reinforcing Corrosion *Final Report*

Stephens, J. E., Connecticut Univ., USA; Nov. 20, 1995; 27p; In English

Report No.(s): PB96-147970; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This study evaluated a class of organic compounds (alkenyl dicarboxylic acid diammonium salts) as additives for concrete that may improve its durability against freezing and thawing and reinforcement corrosion. Tests for freeze-thaw resistance, compression and indirect tension were performed to determine the effect of additives on concrete properties. Porosity and permeability measurements also were made. Results showed a rather adverse effect of admixtures on concrete workability and strength but excellent freeze-thaw resistance presumably due to air entrainment. The admixtures also appeared to act as effective chelating agents for several heavy metals from incinerator ash in concrete.

NTIS

Additives; Durability; Concretes; Evaluation; Prevention; Corrosion; Reinforcement (Structures)

19980016135 National Association of Home Builders, Washington, DC USA

Commentary on the Prescriptive Method for Residential Cold-Formed Steel Framing

May 1996; 88p; In English

Report No.(s): PB96-190822; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The report, prepared by HUD, the National Association of Home Builders, and the American Iron and Steel Institute, provides background, engineering assumptions, and detailed calculations for the provisions of the Prescriptive Method for Residential Cold-Formed Steel Framing, First Edition. The Prescriptive Method was developed as an interim guideline for the construction of one- and two-family residential dwellings using cold-formed steel framing.

NTIS

Steels; Cold Working; Studs (Structural Members); Buildings; Frames; Structural Design

19980016139 Army Cold Regions Research and Engineering Lab., Hanover, NH USA

Manual of Practice for an Effective Anti-Icing Program: A Guide for Highway Winter Maintenance Personnel

Ketcham, S. A., Army Cold Regions Research and Engineering Lab., USA; Minsk, L. D., Army Cold Regions Research and Engineering Lab., USA; Blackburn, R. R., Army Cold Regions Research and Engineering Lab., USA; Fleege, E. J., Army Cold Regions Research and Engineering Lab., USA; Jun. 1996; 69p; In English

Report No.(s): PB96-178934; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This manual provides information for successful implementation of an effective highway anti-icing program. It is written to guide the maintenance manager in developing a systematic and efficient practice for maintaining roads in the best conditions possible during a winter storm. It describes the significant factors that should be understood and must be addressed in an anti-icing program, with the recognition that the development of the program must be based on the specific needs to the site or region within its reach. The manual includes recommendations for anti-icing practices and guidance for conducting anti-icing operations during specific precipitation and weather events.

NTIS

Highways; Manuals; Deicing

19980016150 NERAC, Inc., Tolland, CT USA

Resin Transfer Molding. (Latest Citations from Engineered Materials Abstracts)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863907; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the fabrication of polymer composites through resin transfer molding. The development of suitable resins, equipment design, process monitoring and control, and the elimination of defects in the finished product are discussed. The chemical, mechanical and physical properties of the processed material are examined. Computer simu-

lation of the molding process, and the agreement between theoretical predictions and experimental results are included.(Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Resin Transfer Molding

19980016550 American Council for an Energy-Efficient Economy, Washington, DC USA

Gas DSM and Fuel-Switching: Opportunities and Experiences *Final Report*

Nadel, S., American Council for an Energy-Efficient Economy, USA; Eto, J., American Council for an Energy-Efficient Economy, USA; Kelley, M., American Council for an Energy-Efficient Economy, USA; Jordan, J., American Council for an Energy-Efficient Economy, USA; Jul. 1994; 465p; In English

Report No.(s): PB96-195201; NYSERDA-94-10; No Copyright; Avail: CASI; A20, Hardcopy; A04, Microfiche

The study's objectives can be summarized into two areas: First, to provide information to identify end-use energy efficiency opportunities for both natural gas conservation and fuel switching opportunities, including insights as to where energy efficiency can be obtained and the relative importance of each source. Second, to provide an estimate of the potential amount or magnitude of energy efficiency available. The magnitude of efficiency can be used to judge the relative importance of DSM strategies as a resource in meeting the energy requirements of the State's natural gas users.

NTIS

Energy Conservation; Energy Requirements; Natural Gas; Residential Energy; Energy Technology

19980016619 NERAC, Inc., Tolland, CT USA

Design for Assembly as a Manufacturing Technique. (Latest Citations from the INSPEC Database)

Nov. 1995; In English; Page count unavailable.

Report No.(s): PB96-855200; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the implementation of design for manufacturing techniques as the first step in product design and assembly. by including the manufacturing process in the product design, quality and cost objectives can be met while decreased assembly time, reduced inventory, and higher reliability can be realized. The use of robotics and computer assisted technologies using design for assembly techniques is considered briefly. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Manufacturing; Assembling

19980016622 NERAC, Inc., Tolland, CT USA

Brazing and Soldering Aluminum. (Latest Citations from the Ei Compendex*Plus Database)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-855994; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning equipment and techniques for brazing and soldering aluminum and aluminum alloys. Methods include ultrasonic soldering and vacuum brazing. Techniques for the fabrication of aluminum heat exchangers, metal to glass seals, and honeycomb metal structures are presented. Criteria for the selection of soldering fluxes are discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Aluminum Alloys; Brazing; Ultrasonic Soldering; Aluminum

19980016761 Naval Postgraduate School, Monterey, CA USA

An Adaptive Inspection Sampling Program for Determining Coating Failure of Nimitz Class Aircraft Carrier Tanks and Voids

Thornell, Mark E., Naval Postgraduate School, USA; Mar. 1997; 164p; In English

Report No.(s): AD-A330943; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This thesis addresses Nimitz class aircraft carrier tank and void maintenance. It contributes to the solution of current maintenance problems in four ways. First, it stratifies Nimitz class aircraft carrier tanks and voids into ten groups and assigns a criticality factor to each group. These groups and criticality factors can be extended to other classes of ships. Second, it demonstrates methods to estimate the survival function of tank and void coating lifetimes based on inspection data. Actual estimates of the survival function for each group are given, but are based on current data of questionable quality. Third, it develops a decision tool to plan inspection

tions and budget maintenance costs over multiyear periods. Preliminary application of this tool demonstrates the cost effectiveness of driving maintenance by inspection. Finally, sampling plans provided to AIRLANT for CVN 71 1997 EDSRA and CVN 73 1997 SRA are discussed. These sampling plans were developed to obtain unbiased estimates of the current proportion of failed tanks within each group. by using plans such as these, unbiased estimates of the survival function for each group can be computed. This thesis provides a framework for developing a long term inspection and maintenance program.

DTIC

Aircraft Carriers; Fuel Tanks; Protective Coatings; Inspection; Failure Analysis

19980016807 Federal Highway Administration, Office of Engineering and Highway Operations Research and Development, McLean, VA USA

Ruggedness Testing of the Dynamic Shear Rheometer and the Bending Beam Rheometer Test Procedures *Final Report, Sep. 1992 - Dec. 1994*

Shashidhar, N., Federal Highway Administration, USA; Chollar, B. H., Federal Highway Administration, USA; Dec. 1995; 73p; In English

Report No.(s): PB96-165162; FHWA/RD-95/079; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Ruggedness testing of the bending beam rheometer (BBR) and the dynamic shear rheometer (DSR) was performed. Four laboratories participated in this effort. Three materials were used for BBR ruggedness testing and four materials were used for DSR ruggedness testing. Measurement of the creep stiffness and m-value at 60 s with the BBR was found to be fairly repeatable. of the factors studied, the mold used for casting the beams had a significant effect. Different beam thicknesses by the two molding techniques was found to be a factor that caused this variation. Other unknown factor(s) also seemed to contribute to this effect. The test temperature also had a significant effect and should be controlled to plus or minus 1 degree C. Ruggedness testing is a screening test for 'detecting and reducing sources of variation in a test method early in its development and prior to an inter-laboratory study' for precision and bias. It is the goal of this screening process to reduce the variability of test results to a minimum through the detection and control of pertinent variables.

NTIS

Creep Properties; Detection; Rheometers; Ruggedness; Variational Principles

32

COMMUNICATIONS AND RADAR

Includes radar; land and global communications; communications theory; and optical communications. For related information see also 04 Aircraft Communications and Navigation and 17 Space Communications, Spacecraft Communications, Command and Tracking. For search and rescue see 03 Air Transportation and Safety, and 16 Space Transportation.

19980012533 Naval Command, Control and Ocean Surveillance Center, San Diego, CA USA

Dipole and Monopole Antenna Gain and Effective Area for Communication Formulas

Logan, J. C., Naval Command, Control and Ocean Surveillance Center, USA; Rockway, J. W., Naval Command, Control and Ocean Surveillance Center, USA; Sep. 1997; 19p; In English

Report No.(s): AD-A332891; NRAD-TR-1756; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A comparison involving antenna measurements and performance predictions has sometimes revealed a 6-dB discrepancy between the ground wave transmission measurements and the corresponding calculations. The source of this 6-dB discrepancy is attributable to an incorrect definition of the effective area of the receiving vertical monopole antenna. This erroneous definition is that the effective area of the vertical receiving monopole is twice as large as that of a corresponding receiving dipole in free space. This report shows that the effective area of a monopole is one-half that of the corresponding dipole. It is this value of effective area that resolves the 6-dB discrepancy between measurements and analysis. This definition has meaning in the general forms of the transmission formula for communication and radar systems.

DTIC

Dipole Antennas; Monopole Antennas

19980012552 NERAC, Inc., Tolland, CT USA

Integrated Voice/Data Communication. (Latest citations from the INSPEC Database)

Jan. 1996; In English

Report No.(s): PB96-859186; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development and use of integrated voice/data systems in communications. Topics include performance requirements and descriptions, switching and control systems, protocol analyses, and sales and marketing aspects. Office systems and satellite communication aspects are also discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Voice Communication; Data Transmission; Bibliographies

19980012554 NERAC, Inc., Tolland, CT USA

Millimeter Wave Radars. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English; Page count unavailable.

Report No.(s): PB96-859103; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development of radar in the millimeter wavelength range. Millimeter wave radar offers a compact system with good resolution. Primary applications include use on helicopters and aircraft, and in guidance systems for missiles. Additional applications include meteorological radar. Some citations explore scattering and attenuation of millimeter wavelengths in the atmosphere, and the development of millimeter wave components and radomes. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Millimeter Waves; Radar

19980012712 National Bureau of Standards, Boulder, CO USA

Metrology for Electromagnetic Technology: A Bibliography of NIST Publications

Bradford, A. G., National Bureau of Standards, USA; Aug. 1997; 100p; In English

Report No.(s): PB98-104110; NISTIR-5064; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

The bibliography lists the publications of the NIST Electromagnetic Technology Division staff during the period from 1970 through publication of the report. A few earlier references that are directly related to the present work of the Division are also given. The bibliography includes publications in the cryoelectronic metrology and superconductor and magnetic measurement areas.

NTIS

Bibliographies; Metrology; Superconductors (Materials); Magnetic Measurement; Cryogenics

19980013136 NERAC, Inc., Tolland, CT USA

Store-and-Forward Technology and Applications. (Latest citations from the INSPEC Database)

Jan. 1996; In English

Report No.(s): PB96-860036; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the properties and effective use of store-and-forward technology in communications systems. Citations focus on implementation, evaluation, models, algorithms, and architecture, and include comparisons with alternate communications mechanisms. Topics cover deadlock prevention, file transfer service, feedback control of congestion, and coding control schemes. Applications include packet switching networks, video-on-demand service, low-Earth-orbit satellites, multihop lightwave networks, and facsimile mail. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Communication Networks; Buffer Storage

19980013142 NERAC, Inc., Tolland, CT USA

Multimedia Teleconferencing. (Latest citations from the INSPEC Database)

Jan. 1996; In English; Page count unavailable.

Report No.(s): PB96-859087; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the techniques and applications of multiparty conferencing. The citations describe multimedia conferencing, universal collaboration, research and piloting activities, teleconferencing, multiparty desktop

conferencing, dial-up conferencing, and live multimedia telecommunication. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Teleconferencing; Multimedia

19980013143 NERAC, Inc., Tolland, CT USA

Modems: Frequency Shift Keying Systems. (Latest citations from the INSPEC Database)

Jan. 1996; In English

Report No.(s): PB96-859293; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning design, implementation, construction, and testing techniques of frequency shift keying (FSK) modems. The citations explore digital design, error correction methods, noise reduction, and reliability of FSK communication systems. Modem systems for telephone communication networks are presented. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Frequency Shift Keying; Modems

19980013144 NERAC, Inc., Tolland, CT USA

Interactive Television. (Latest citations from the ABI/Inform Database)

Jan. 1996; In English

Report No.(s): PB96-859871; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning interactive television (TV) and related business and consumer issues. Topics include the relation of interactive TV to telephone and cable TV companies, software, the information superhighway, and advertising. On-demand programming, home shopping, downloading of news and other information, and broadcasting issues are examined. Some company-specific citations regarding telephone and cable carriers and entertainment companies are included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Television Systems

19980013146 National Inst. for Fusion Science, Nagoya, Japan

Simulation study on cross polarization scattering of ultrashort-pulse electromagnetic waves

Katsuragawa, Naoki, Tsukuba Univ., Japan; Hojo, Hitoshi, Tsukuba Univ., Japan; Mase, Atushi, Tsukuba Univ., Japan; Nov. 1996; 26p; In English

Report No.(s): NIFS-462; DE97-745403; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Simulation study on cross polarization scattering of ultrashort-pulse electromagnetic waves due to magnetic fluctuations is presented. One-dimensional coupled wave equations for the ordinary and extraordinary modes are solved for incident unipolar sub-cycle pulses in an inhomogeneous magnetized plasma. It is shown that the peak frequencies in the frequency-spectral signals of the mode-converted reflected waves are determined from the Bragg resonance condition in the wave numbers of the ordinary mode, the extraordinary mode and the magnetic fluctuations for relatively short-wavelength localized magnetic fluctuations.

DOE

Scattering; Plasmas (Physics); Spectral Reflectance; Wave Propagation; Computerized Simulation; Electromagnetic Radiation; Polarization (Charge Separation)

19980013154 NERAC, Inc., Tolland, CT USA

Microcomputers: Telecommunication Applications. (Latest citations from the Ei Compendex*Plus database)

Jan. 1996; In English; Page count unavailable.

Report No.(s): PB96-858964; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning telecommunication applications of microcomputers. Telephones, data transmission, teleprinters, facsimile communication, and communication controllers are among the applications cited.

NTIS

Bibliographies; Microcomputers; Telecommunication

19980013161 Technopole Ltd., Espoo, Finland

New Products and High Value Added Services for Mobile Communications

Vazvan, B., Technopole Ltd., Finland; 1996; ISSN 1239-1352; 14p; In English; 1996 GSA World Congress, 20-22 Feb. 1996, Cannes, France

Report No.(s): PB96-173935; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Investors, mobile operators and manufacturers are welcomed to realize the ideas introduced here.

NTIS

Mobile Communication Systems; Radio Communication

19980013644 NERAC, Inc., Tolland, CT USA

Differential Phase Shift Keying (DPSK) Coded Communication Systems. (Latest citations from the INSPEC Database)

Jan. 1996; In English

Report No.(s): PB96-859343; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the performance of differential phase shift keying (DPSK) coded communication systems. Citations focus on the design, development, and implementation of DPSK modulation schemes. Bit error rate analyses are described for noisy, fading, and jammed channels. Optimization of modulator and demodulator designs is also discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Phase Shift Keying; Bibliographies; Telecommunication

19980013646 NERAC, Inc., Tolland, CT USA

Laser Infrared Radar. (Latest citations from the Searchable Physics Information Notices Database)

Jan. 1996; In English

Report No.(s): PB96-859640; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning LIDAR (laser infrared radar) remote sensing and measuring technology and applications in atmospheric physics, geology and oceanography. LIDAR system design, error analysis, performance evaluation and development for analyzing and detecting atmospheric aerosols, atmospheric compositions, volcanic clouds and ocean environments are included. Discussions on tunable, doppler and mobile LIDAR are also presented.

NTIS

Bibliographies; Optical Radar; Infrared Radar; Design Analysis; Error Analysis

19980013651 NERAC, Inc., Tolland, CT USA

Satellite Communications: Very Small Aperture Terminals (VSAT). (Latest citations from The Computer Database)

Jan. 1996; In English

Report No.(s): PB96-859780; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning very small aperture terminals (VSAT) for satellite communications receivers. VSATs consist of a communications satellite, a hub, a central control station and any number of remote terminal users. Marketing information, applications of VSATs, VSAT effectiveness, and costs are among the topics discussed. VSATs are being used in grocery chains, retail chains, hotel chains, insurance companies, automakers, and other companies with geographically dispersed branches. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Satellite Communication; VSAT (Network)

19980013655 NERAC, Inc., Tolland, CT USA

Pulse Compression. (Latest citations from the INSPEC Database)

Jan. 1996; In English

Report No.(s): PB96-860044; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development and assessment of pulse compression technology. Optical, magnetic, RF, chirped, and phase and carrier-free coded pulse compression are examined. References also discuss pulse compressors, compressed pulse separation, pulse shaping and reshaping, chirped and sub-picosecond pulses, bandpass and low-pass fil-

ters, fiber grating, and frequency doubling. Applications include optical and digital communication, radar systems, meteorological measurements, plasma diagnostics, and materials testing.

NTIS

Bibliographies; Pulse Compression; Picosecond Pulses; Technology Assessment; Pulse Communication

19980013658 Oslo Univ., Dept. of Physics, Norway

Signal processing and statistical analysis of spaced-based measurements

Iranpour, Kambiz, Oslo Univ., Norway; May 1996; ISSN 0332-5571; 44p; In English

Report No.(s): OUP-96-08; DE97-632574; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The reports deals with data obtained by the ROSE rocket project. This project was designed to investigate the low altitude auroral instabilities in the electrojet region. The spectral and statistical analyses indicate the existence of unstable waves in the ionized gas in the region. An experimentally obtained dispersion relation for these waves were established. It was demonstrated that the characteristic phase velocities are much lower than what is expected from the standard theoretical results. This analysis of the ROSE data indicate the cascading of energy from lower to higher frequencies.

DOE

Signal Processing; Low Altitude; Auroral Zones; Phase Velocity; Plasma Waves; Wave Propagation

19980014080 Houston Advanced Research Center, The Woodlands, TX USA

Seismic Signal Processing for the Detection of Gas Pipelines and Leaks Using Ground-Penetrating Radar *Annual Report, Jan.-Dec. 1995*

Peddy, C. P., Houston Advanced Research Center, USA; Ramaswamy, M., Houston Advanced Research Center, USA; Mar. 1996; 41p; In English

Report No.(s): PB97-100606; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report discusses the results of work accomplished in Year 1 of a continuing project. The goal of this year was to investigate the use of seismic acquisition techniques and processing algorithms to enhance GPR images for the detection of pipes and leaks. Different seismic algorithms were tested to determine which ones enhance images most efficiently. The results of this analysis were incorporated into a standard processing flow.

NTIS

Leakage; Gas Pipes; Ground Penetrating Radar; Pipelines; Pipes (Tubes)

19980014436 National Inst. of Standards and Technology, Electromagnetic Fields Div., Boulder, CO USA

Uncertainty Analysis for NRaD Radar Cross Section Measurements

Prickett, M. J., National Inst. of Standards and Technology, USA; Bloomfield, R. A., National Inst. of Standards and Technology, USA; Kinzel, G. A., Naval Command, Control and Ocean Surveillance Center, USA; Wittmann, R. C., National Inst. of Standards and Technology, USA; Muth, L. A., National Inst. of Standards and Technology, USA; Apr. 1997; 38p; In English

Report No.(s): PB97-167480; NISTIR-5061; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Naval Command, Control and Ocean Surveillance Center RDT&E Division (NRaD) conducts Radar Cross Section (RCS) measurements on US naval ships and other targets. This document discusses the assessment of measurement uncertainty and follows general guidelines proposed by the National Institute of Standards and Technology (NIST).

NTIS

Radar Cross Sections; Error Analysis; Radar Measurement

19980014458 Mitre Corp., McLean, VA USA

An Unconventional, Highly Multipath-Resistant, Modulation Scheme

Press, W., Mitre Corp., USA; Dally, W., Mitre Corp., USA; Eardley, D., Mitre Corp., USA; Garwin, R., Mitre Corp., USA; Horowitz, P., Mitre Corp., USA; Sep. 1997; 42p; In English

Report No.(s): AD-A331647; JSR-97-160; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We have shown that hypercarrier modulation with binary on/off keying, and with bit times longer than the whole "ringing time" of the urban environment, is potentially capable of achieving megabit per second data rates in a manner that is completely insensitive to multipath fading. A straw-man design, using current COTS components, has been presented. While we would not want to claim that this design is exactly optimal (or even completely correct), it illustrates that brassboard tests should neither be difficult, nor expensive. The scheme proposed here is sufficiently different from conventional high bitrate modulation methods,

that it should be quite difficult for an adversary to recognize as such. Indeed, with sufficient spreading and good operational practice, it should escape detection completely.

DTIC

Signal Processing; Transmission Loss; Multipath Transmission; Modulation; Fading; Rates (Per Time)

19980014519 NERAC, Inc., Tolland, CT USA

Microwave Antennas: Design. (Latest citations from the Aerospace Database)

Jan. 1996; In English

Report No.(s): PB96-859244; NASA/TM-96-206989; NAS 1.15:206989; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design of microwave antennas. Topics include a discussion of the recent developments in microfichermicrowave antennas, and in design techniques such as computer-aided design (CAD). Various types of antenna configurations are covered, including rectangular, elliptical, and reflectarray microstrip antennas, multibeam, circular-disc, Yagi-Uda, and horn reflectors. Applications include microwave antennas for satellite communication systems, telemetry links, and solid state microwave power transmission systems.

NTIS

Bibliographies; Microwave Antennas; Design Analysis; Computer Aided Design; Antenna Design

19980014522 Naval Postgraduate School, Monterey, CA USA

Design and Prototype Development of an Optimum Symmetrical Number System Direction Finding Array

Papandreou, Panayiotis, Naval Postgraduate School, USA; Mar. 1997; 100p; In English

Report No.(s): AD-A331816; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

One method of estimating the direction of an electromagnetic source is based on phase comparison. In this thesis the design and fabrication of a prototype antenna to demonstrate a new DF antenna architecture is described. Four antenna elements are grouped into three pairs with element spacing according to a set of symmetrical number system pairwise relatively prime moduli ($m_1 = 3$, $m_2 = 4$, $m_3 = 5$). The phase difference between each pair of elements is a symmetrical folding waveform that is determined using a mixer. The output voltage from each pair is amplitude analyzed using a small comparator ladder. In each channel, the symmetrically folding waveform, folds in accordance with the channel modulus and thus, only requires a precision according to that modulus. A high resolution DF is achieved after the N different SNS moduli are used and the results of these low-precision channels are recombined to yield the direction of arrival. The frequency of operation of the prototype is 8.5 GHz. Results based on measured and simulated data are resented.

DTIC

Antenna Arrays; Radio Direction Finders; Design Analysis; Antenna Design; Fabrication; Prototypes

19980014819 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

2-Phase Asynchronous Event Driven Buffer with Completion Detection Signalling

Lloyd, L., Newcastle-upon-Tyne Univ., UK; Yakovlev, A. V., Newcastle-upon-Tyne Univ., UK; Koelmans, A. M., Newcastle-upon-Tyne Univ., UK; Feb. 1997; 39p; In English

Report No.(s): PB97-176697; TRS-573; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

A design is presented for the implementation of an event driven asynchronous buffering mechanism which function within a manner similar to that of synchronous 'tri state' driver element. The design is derived from a series of currently available asynchronous logic elements that perform latching functions from within either a two-phase or a four-phase operational medium. A solution to the problem of the correct generation of completion signals from within such a two-phase functionality is presented. The final buffer design is verified using both a Petri Net and Signal Transition Graph analysis with the resultant circuit realization being simulated using the WARP VHDL Development System.

NTIS

Microprocessors; Logic Design; Design Analysis; Asynchronous Transfer Mode; Buffer Storage

19980014822 Grand Accelerator National d'Ions Lourds, Centre National de la Recherche Scientifique, Caen, France

The radio frequency systems for the THI and SPIRAL projects at GANIL

DiGiacomo, M., Grand Accelerator National d'Ions Lourds, France; Bieth, C., Grand Accelerator National d'Ions Lourds, France; 1996; 3p; In English; 30th; ECPM, Sep. 1996, Catania, Italy

Report No.(s): GANIL-S-96-05; CONF-9609341; DE97-620608; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

The intermediate energy re buncher R2, heart of the "High Intensity Transport" (THI) project, has been installed in between the two separated sector cyclotron. On the other hand, the construction of the bunchers and of the cyclotron resonators for the "on Line Radioactive Ions Production System" (SPIRAL) facility has begun. A general overview of these systems is given here, as well as the very first results of performance testing. (D.L.).

DOE

Radio Frequencies; Beams (Radiation); Bunching; Beam Currents; Cyclotrons

19980015117 Alabama Univ., Dept. of Physics, Huntsville, AL USA

Polarization Diversity Active Imaging: Mueller Matrix Imaging Polarimetry of Spheres and Cones *Final Report, Aug. 1996 - Mar. 1997*

Chipman, Russell A., Alabama Univ., USA; Gerligand, Pierre-Yves, Alabama Univ., USA; Sornsin, Elizabeth A., Alabama Univ., USA; Smith, Matthew H., Alabama Univ., USA; Mar. 1997; 89p; In English

Report No.(s): AD-A330963; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This final report describes experiments into Polarization Diversity Active Imaging (PDAI) performed at the Physics Department of the University of Alabama in Huntsville (UAH). Polarization Diversity Active Imaging illuminates a scene or target with a sequence of polarization states and then measures images of the polarization state scattered from a scene or target. These polarization images are then analyzed to provide additional details in the optical signature of objects by quantifying the object interaction with polarized light. These polarization images are then analyzed in the following sequence: (1) Measure the Muller matrix image associated with the scene, (2) Map the retardance, diattenuation, and depolarization images for the scene, (3) Estimate the plane of incidence and target orientation pixel by pixel, and (4) Obtain estimates of the refractive index of objects in the scene and other information relating to texture. With a successful Polarization Diversity Active Imaging apparatus, a series of polarization images would be acquired, the image would be displayed, and then we could overlay images of the retardance, diattenuation, depolarization, orientation of the surface normal, and estimates of refractive index. These additional images would be useful for image interpretation tasks such as clutter rejection, target identification, target classification, target orientation, etc. Polarization Diversity Active Imaging may prove useful for many difficult imaging tasks such as satellite imaging, plume/hard body identification, hard body/wake, unresolved objects, and overcoming camouflage. But this present contract specifically aims to evaluate if Polarization Diversity Active Imaging could measure the orientation of bodies such as satellites in space and estimate their refractive index.

DTIC

Imaging Techniques; Image Processing; Target Recognition; Clutter; Polarized Light; Radar Signatures

19980015226 NERAC, Inc., Tolland, CT USA

Antenna Arrays. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864566; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning the design and applications of antenna arrays for radar, communications, missile guidance, navigation, and spacecraft communications. Types of antenna arrays include adaptive, directional, dipole, scanning, slot waveguide, commutated, multiple-beam, microstrip, and broadband antennas. Excluded from this bibliography are studies dealing with phased array antennas.

NTIS

Bibliographies; Antenna Arrays; Antenna Design

19980015286 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Multifrequency, Multipolarization External Calibration of the SIR-C/X-SAR Radars

Freeman, Anthony, Jet Propulsion Lab., California Inst. of Tech., USA; Sarabandi, K., Michigan Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 55-57; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress and the future plans for the following objectives are discussed: (1) Assess the accuracy at which the SIR-C/X-SAR standard data products can be calibrated through the use of ground calibrators to estimate the end-to-end system polarization calibration constants (or distortion parameters) and incorporate the constants into the data processing; (2) Study the cross-calibration between three multipolarization systems: SIR-C, the National Aeronautics and Space Administration/Jet Propulsion Laboratory (NASA/JPL) DC-8 SAR, and the University of Michigan ground-based polarimetric scatterometer; (3) Evaluate the calibration "stability" of SIR-C/X-SAR (measured by variations in the calibration constants) over the range swath width and over a specified

distance in azimuth. Variations over a 12-hour period (between ascending and descending passes) will also be studied; and (4) Develop a cost-effective calibration plan including development of inexpensive polarimetric active calibrators.

Derived from text

Calibrating; Cross Correlation; End-to-End Data Systems; Shuttle Imaging Radar; Synthetic Aperture Radar

19980015301 Kansas Univ. Center for Research, Inc., Lawrence, KS USA

Inflight Antenna Pattern Measurement for SIR-C

Moore, Richard K., Kansas Univ. Center for Research, Inc., USA; Holtzman, Julian C., Kansas Univ. Center for Research, Inc., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 121-127; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Progress, significant results, and future plans are considered for the following project objectives: (1) Obtain the vertical antenna patterns of the SIR-C radars to allow improved radiometric calibration of data for other investigators; (2) to determine how much the vertical antenna pattern changes after launch to aid in designing future space radars and to determine if such measurements are needed on all future space radars.

Derived from text

Antenna Radiation Patterns; Shuttle Imaging Radar; Radar Antennas

19980015343 NERAC, Inc., Tolland, CT USA

Joint Photographic Experts Group (JPEG). (Latest citations from the Ei Compendex*Plus database)

Jan. 1996; In English

Report No.(s): PB96-859426; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the interNational data compression standard of the Joint Photographic Experts Group (JPEG). Topics include references to the image compression and decompression algorithms for still color images, encoding and decoding, and discrete cosine transform (DST). Applications include satellite images, digital video-on-demand, and interlaced and noninterlaced television pictures. Citations reference lossy images, browsing, image quality, image transmission time, and other data compression techniques such as Moving Picture Experts Group (MPEG). (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Data Compression; Images

19980015344 NERAC, Inc., Tolland, CT USA

Phase Shifters (Excluding Antenna Systems). (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Jan. 1996; In English

Report No.(s): PB96-859418; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning the design and applications of phase shift circuits. Phase shifter types include ferrite, semiconductor, digital, differential, programmable, and voltage controlled devices. Applications include microwave equipment, surface acoustic wave devices, strip transmission lines, phase shift keyers, signal processors, video and holographic recording, radio communication, and control devices. Patents on phase shifters for antenna systems are found in a separate bibliography. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Phase Shift Circuits

19980015353 Nippon Electric Co. Ltd., Tokyo, Japan

NEC Technical Journal. Serial 314: Special Issue on ATM Transmission Network, Volume 48

Apr. 1995; 100p; In Japanese; Portions of this document are not fully legible

Report No.(s): PB96-129457; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Contents include the following: Remarks for Special Issue on ATM Transmission Network; Tendency toward ATM Transmission Networking; Tendency toward ATM Standardization Activities in ITU-T; ATM Crossconnect System; ATM 2.4 Gbit/s Interface Package; ATM Based Leased Line System; ATM CLAD Equipment; ATM Multiplex System MM-Node 9510; ATM

Internetworking; Network Interface Card for ATM; LSI Technology for ATM Equipment; High-Density Packaging Technology for ATM; High-Speed Transmission Technology with Backplane; and Reliability of Space TWTs.

NTIS

Asynchronous Transfer Mode; Communication Networks

19980015357 Technische Univ., Centre for Telematics and Information Technology, Twente, Netherlands

Performance Aspects of the Platinum Signaling Systems Final Report

Veldkamp, E. P., Technische Univ., Netherlands; 1997; 90p; In English

Report No.(s): PB97-204440; CTIT-TR-96-28; Copyright Waived; Avail: CASI; A05, Hardcopy; A01, Microfiche

The Platinum project (PLATform providing Integrated services to New Users of Multimedia) aims at developing innovative multimedia applications together with the underlying advanced broadband architecture. The focus is on some service requests frequently encountered in applications for which the Platinum signaling system is intended (e.g., video conference.) For a particular service request, the relevant performance requirements that are affected by the signaling system are identified and considered for evaluation. In order to develop appropriate performance models, the signaling system architecture, and protocols involved in establishing the service request are considered. These models enable the comparison between design alternatives, and the assessment of whether a particular implementation satisfies the performance requirements. Specific issues considered for investigation are: the use of priorities to improve the performance of delay-sensitive service requests; the determination of potential signaling protocol bottlenecks; the distribution scheme for special resources (e.g., bridges, converters) in a network; and the implementation method for a specific service request parameter (the mandatory/optional parameter).

NTIS

Multimedia; Performance Prediction; Platinum; Priorities; Protocol (Computers); Sensitivity

19980015360 Wyle Labs., Inc., Arlington, VA USA

Noise Data Acquisition and Display System (NDADS): User's Manual, 2.0 Final Report, Oct. 1995 - Oct. 1996

Page, Juliet A., Wyle Labs., Inc., USA; Dec. 1996; 87p; In English

Contract(s)/Grant(s): F41624-95-C-6014; AF Proj. 3037

Report No.(s): AD-A328017; WR-96-36; AL/OE-TR-1996-0180; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

NDADS, Noise Data Acquisition and Display System, is an interactive, IBM-compatible, PC-based computer program for the user-enhanced automation and creation of flight tracks and profiles for noise analysis. Actual radar data is in the form of *.RAT files. Radar data is superimposed as a background map in order to provide visual references when analyzing radar data and creating new tracks. An additional feature, the ability to display *.PCX format files as a background, makes the rapid generation of flight tracks from data available only in Hardcopy format possible. This manual is structured according to the menu layout and will guide you through the steps for creating tracks and profiles for use with the NOISEMAP6.0 or INM4.0 noise prediction codes. Instructions and sample tracks, radar data, and filenames and plots are based on the names and data contained within the distribution disk.

DTIC

User Manuals (Computer Programs); Radar Imagery; Radar Data; Data Acquisition; Computer Programs

19980015373 Federal Communications Commission, Washington, DC USA

FCC Record: A Comprehensive Compilation of Decisions, Reports, Public Notices and Other Documents of the Federal Communications Commission of the USA, Volume 11, Pages 2887 to 3444

1996; 573p; In English

Report No.(s): PB96-171376; No Copyright; Avail: CASI; A24, Hardcopy; A04, Microfiche

The publication is a comprehensive compilation of decisions, reports, public notices and other documents of the Federal Communications Commission of the USA.

NTIS

Regulations; Radio Equipment; Telecommunication; Law (Jurisprudence); Broadcasting

19980015374 Mitre Corp., McLean, VA USA

Digital Beam Synthesis (DBS) for a High Capability Opto-Electronic Radar (HICAPOR)

Despain, Alvin M., Mitre Corp., USA; Vesecky, John F., Mitre Corp., USA; Sep. 25, 1997; 88p; In English

Report No.(s): AD-A330988; JSR-97-230; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Digital beam synthesis using a high capability opto-electronic radar (HICAPOR) by Alvin M. Despain and John F. Vesecky. This JASON study investigates the capabilities of HICAPOR by calculating the antenna beam patterns formed by typical implementations of this concept. A wide variety of parameter choices are investigated and antenna patterns for HICAPOR are compared

with conventional phased array and true time delay techniques of beam formation. The presentation begins with an introduction of the HICAPOR concept and how it fits within a high capability, very wide band radar. This is followed by presentation of a computer simulation of the beam and pulse forming capabilities of HICAPOR over a range of radar parameters. HICAPOR beamforming performance is then compared with the performance of other radar types. Finally conclusions are drawn and recommendations made.

DTIC

Optical Radar; Antenna Radiation Patterns

19980015383 Mitsubishi Electric Corp., Tokyo, Japan

Mitsubishi Electric Advance. Imaging and Information Systems Edition, Volume 71 Quarterly Report

Taoka, T., Mitsubishi Electric Corp., Japan; Jun. 1995; 33p; In English

Report No.(s): PB96-129572; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Contents include the following: Overview - Imaging and Information Systems at Present and in the Future; A Tabletop Rear-Projection Television; Highly Sensitive, High-Resolution Thermal Imagers; The XC-2930C 29-Inch Intelligent Display Monitor; Full-Color Sublimation Printers; The G2700-10 Personal Color Printer; A Mini Disc Autochanger for Car Stereos; A Polysilicon TFT Liquid-Crystal Panel for a High-Brightness Projection Display; An Advanced Display Monitor for Personal Computers; Next-Generation Television Systems; and A Digital Satellite Transmission System for HDTV Signals.

NTIS

Imaging Techniques; Display Devices; Research Projects

19980015417 Technische Univ., Group of Mechanics and Structures, Delft, Netherlands

Wave Radiation Due to a Non-Uniformly Moving Load

Wolfert, A. R. M., Technische Univ., Netherlands; Metrikine, A. V., Academy of Sciences (USSR), USSR; Dieterman, H. A., Technische Univ., Netherlands; Jun. 1997; 23p; In English

Report No.(s): PB97-185557; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The wave-radiation in an elastically supported infinite string due to a sudden change in the velocity of a constant moving vertical load is studied. It is shown that radiation results from the transition of the eigenfield moving with the load. In this process both the vertical load and the horizontal force maintaining the motion after the velocity change are performing work. The energy variation law has been verified. Showing that the change of the energy in the eigenfields of the load and the radiated energy is equal to the work done by the moving vertical load and the horizontal force maintaining the motion after the velocity change. To visualize the process of radiation after the velocity jump the transient vibrations of the string have been determined. It shows that the eigenfield of the load before the velocity change is transferred to a new eigenfield by going through a so-called formation zone in which waves are radiating out in both directions.

NTIS

Electromagnetic Radiation; Loads (Forces); Vibration; Velocity

19980015421 National Defence Research Establishment, Avdelningen foer Styrning, Material och Undervattenssensorer, Stockholm, Sweden

Tracking an Underwater Source from Simulated Sensor Measurements of the Momentary Static Electromagnetic Fields Using Two Different Dipole Models

Nedgard, I., National Defence Research Establishment, Sweden; Feb. 1997; 54p; In English

Report No.(s): PB97-206809; FOA-R-97-00423-409-SE; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report describes tracking the position of an electromagnetic source (e.g. a submarine) in water modelled by two different models. The first model is a moving magnetic dipole. The second model is a moving horizontal electric dipole (HED). The authors have used three different tracks for the moving dipoles, one for the magnetic dipole and two for the electric dipole. Four different orientations of the magnetic dipole were examined for track 1 and two different tracks (track 2 and track 3) were examined for the HED (with the orientation of the dipole in the moving direction) in the 3-layer medium. The source position was found through nonlinear parameter estimation by minimizing a criterion function of the measured field and the predicted field at the sensors. The first model is the computationally most effective of the two models, but the second model is the most accurate one (except for the difficulty of determining the depth). Besides these two models, the HED in a 2-layer (air/water) medium is also shown for comparison at the 40 dB noise level.

NTIS

Electromagnetic Fields; Magnetic Dipoles; Tracking (Position); Electric Dipoles

19980015424 Technische Univ., Lab. of Electromagnetic Research, Delft, Netherlands

Nonlinear Inversion in Electrode Logging Using the Modified Gradient Method

Abubakar, A., Technische Univ., Netherlands; Feb. 17, 1997; 124p; In English; Figures in this document may not be legible in microfiche

Report No.(s): PB97-204648; ET/EM-1996-35; Copyright Waived; Avail: CASI; A06, Hardcopy; A02, Microfiche

A method for reconstructing the electrical conductivity profile of an object in a homogeneous embedding medium is applied to the problem of electrode logging as used in the oil industry. Starting from the stationary electric current flow equations, it is possible to formulate two kind of integral representations: the electric current density integral equation, and the electric potential integral equation. Both integral equations have been formulated, and their forward and inverse modeling have been developed. A number of numerical examples are presented in order to demonstrate the robustness and the capabilities of the present inversion procedure. It is also shown that the inversion procedure based on the electric current density integral equations gives much better results than the inversion procedure based on the electric potential integral equation.

NTIS

Electrical Resistivity; Integral Equations; Electrodes; Electric Current

19980015425 Technische Univ., Centre for Telematics and Information Technology, Twente, Netherlands

TOBASCO: An Innovative Approach for Upgrading CATV Fibre-Coax Networks for Broadband Interactive Services

Koonen, A. M. J., Technische Univ., Netherlands; Muys, W., Technische Univ., Netherlands; vanderPlaats, J. C., Technische Univ., Netherlands; HeemstradeGroot, S. M., Technische Univ., Netherlands; Kenter, A., Technische Univ., Netherlands; 1997; 18p; In English

Report No.(s): PB97-204499; CTIT-TR-96-20; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

To introduce broadband interactive services in a fiber-coax CATV network with high splitting ratio, a high-density wavelength multiplexing upgrading strategy in combination with conventional TDAM techniques is presented. It features flexible network reconfiguration via wavelength reassignment at the fiber terminating network units, a high interactive services capacity per user, and improved network scalability.

NTIS

Optical Fibers; Coaxial Cables; Cable Television; Television Transmission; Wavelength Division Multiplexing; Time Division Multiple Access; Broadband

19980015426 Naval Surface Warfare Center, Dahlgren Div., Dahlgren, VA USA

Monopulse Processing for Tracking Unresolved Targets

Blair, W. D., Naval Surface Warfare Center, USA; Pearce, M. Brandt, Naval Surface Warfare Center, USA; Sep. 1997; 205p; In English

Report No.(s): AD-A330556; NSWCDD/TR-97/167; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

When target echoes interfere in a monopulse radar system, the Direction of Arrival (DOA) estimate indicated by the in-phase monopulse ratio can wander far beyond the angular separation of the targets. In addition to closely spaced targets, the problem of unresolved or merged measurements also occurs when targets are observed in the presence of jammer signals or sea surface induced multipath. The failure to detect the presence of this interference and address it in the DOA estimation can be catastrophic to the performance of the tracking algorithm, since its position and velocity estimates determine the association of any subsequent measurements to the target. Monopulse processing for tracking unresolved targets is addressed in four parts. The first part involves the development of the Probability Density Function (PDF) and statistics of the measured amplitude of the sum signal for an arbitrary number of unresolved Rician targets. The PDF and statistics are utilized to develop estimators of the target amplitude parameters, which define the Signal to Noise Ratio (SNR) of the target and discriminators for models of the target amplitude fluctuations. The second part involves the development of the joint PDF and statistics of the complex monopulse ratio for an arbitrary number of unresolved Rician targets and a fixed amplitude target in the presence of multipath.

DTIC

Monopulse Radar; Multipath Transmission; Ocean Surface; Probability Theory; Signal to Noise Ratios; Statistical Analysis; Targets

19980015609 Japan Broadcasting Corp., Science and Technical Research Labs., Tokyo, Japan

Portable Digital Satellite News Gathering (SNG) RF Terminal Using a Flat Antenna. NHK Laboratories Note

Murata, T., Japan Broadcasting Corp., Japan; Mitsumoto, J., Japan Broadcasting Corp., Japan; Fujita, M., Japan Broadcasting Corp., Japan; Tanaka, S., Japan Broadcasting Corp., Japan; Takano, K., Japan Broadcasting Corp., Japan; May 1995; 21p; In English

Report No.(s): PB96-128814; NHK-SERIAL-436; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

In this paper, a Ku-band portable SNG RF terminal using a flat antenna is proposed for making the best use of digital SNG systems. This portable terminal uses 16 planar microstrip subarray antennas, each with a Solid-State Power Amplifier (SSPA) mounted on its rear. The proposed RF terminal is different from a conventional portable RF terminal with parabolic antenna in that it has electronic tracking capability. Electronic antenna tracking reduces time it takes to set up the terminal because precise alignment of the antenna is not required. The flat antenna meets the design objectives specified by the ITU-R Recommendations. The SSPAs have an efficiency of 21% and a power output of 5 W. The tracking performance of the feedback system which uses four subarrays, is also presented.

NTIS

Antenna Design; Digital Systems; Portable Equipment; Satellite Communication

19980015618 General Services Administration, Washington, DC USA

Federal ADP and Telecommunications Standards Index, October 1995

Oct. 1995; 93p; In English

Report No.(s): PB96-180542; MKR-96-1-A; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The Handbook is not regulatory; it is a guide to Automatic Data Processing (ADP) and telecommunications standards available to the acquisition and use of ADP and telecommunications equipment and services. It contains recommended terminology to incorporate standards in solicitation, and includes a compilation of the National and International standards which should be considered for use in satisfying requirements not covered by Federal standards.

NTIS

Data Processing; Telecommunication; Standards

19980015623 NERAC, Inc., Tolland, CT USA

Modems. (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864178; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, selection, and utilization of modems. Applications discussed include data transmission, laser communications, voice communications, satellite communications, and interactive cable television. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Modems

19980015625 NERAC, Inc., Tolland, CT USA

Digital Video Disks. (Latest Citations from the Computer Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-863170; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning an emerging new data storage format called the digital video disk (DVD). DVDs provide a super dense storage media for videos. References focus on development, implementation, features, and market introduction of this new technology. Standards, applications, and corporate agreements associated with the DVD are also discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Data Storage; Video Disks

19980015742 Army Research Lab., Information Science and Technology Directorate, Adelphi, MD USA

The Asymmetry Parameter and Aggregate Particles Progress Report, 1 Oct. 1996 - 1 Apr. 1997

Videen, Gordon, Army Research Lab., USA; Pinnick, Ronald G., Army Research Lab., USA; Ngo, Dat, NgoCo, USA; Fu, Qiang, Dalhousie Univ., Canada; Chylek, Petr, Dalhousie Univ., Canada; Oct. 1997; 26p; In English

Report No.(s): AD-A330527; ARL-TR-1393; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We derive and examine the general expression for the scattering asymmetry parameter g . For aggregate particles, the asymmetry parameter is made up of two terms. One term accounts for interference effects of the electromagnetic fields radiating from the individual subsystems. The other term accounts for interaction effects of the electromagnetic fields between these subsystems.

Enhanced backscatter is one phenomenon resulting from these interactions. Numerical results demonstrate that interference effects play a dominant role when the separation distance between aggregates is smaller than half the incident wavelength. As the separation distance becomes large, both interference and interaction effects drop off, and the asymmetry parameter approaches that of the individual particle constituents.

DTIC

Backscattering; Electromagnetic Fields

19980016007 Nippon Electric Co. Ltd., Tokyo, Japan

NEC Technical Journal: Serial 318, Volume 48

Sep. 1995; 108p; In Japanese; Portions of this document are not fully legible

Report No.(s): PB96-129440; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Contents include the following: Telecommunication Service Development Environment with Object-oriented Model; Securing PrivateNet on the Internet; ATM based Virtual LAN towards 'Function Space' Realization; Development of ATM-based Virtual LAN platform 'LAN Emulation'; Network Server for the Internet Connection - Goah/NetworkSV - Development and Commercialization of a UNIX Cluster System; Distributed Print Spool System 'spoolernet'; High Performance C Compiler for V850 Family CA850; Porting UNIX Middle-Ware Onto Multiple Platforms; ChronoGrapher - A Performance Analysis Tool for Windows3.1; Fast Rate Asynchronous Data Compatible ISDN Terminal Adapter AtermIT30; Development of PC Card Type Wireless Teleterminal Modem; New Terminal for Centralized Alarm System; Near-field Measurement System for Phased Array Antennas; and Electrostatic Discharge Immunity-Estimation System.

NTIS

Communication Networks; Computer Networks; Telecommunication

19980016126 Naval Postgraduate School, Monterey, CA USA

Characterization of OSCAR HF Radar Data in Monterey Bay

Boyer, Kimberley F., Naval Postgraduate School, USA; Mar. 1997; 105p; In English

Report No.(s): AD-A330032; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

In this study, OSCAR data is evaluated with regard to semi-diurnal (M2) and diurnal (K1) tidal period fluctuations, the sea-breeze, seabreeze influenced flow, and both standard and canonical-day mean flow patterns. The OSCAR data is considered on its own and in comparison to similar data types previously gathered by CODAR, a previously established Monterey Bay HF radar system. Two of three CODAR sites were co-located with the two OSCAR sites. Internal wave influence is observed in the M2 tidal constituent analysis and the seabreeze greatly influences fluctuations of the K1 tidal period. Results from analysis of OSCAR data replicated or reinforced data and results from the CODAR system. Initial OSCAR data appears not to have been significantly affected by possible distortion of the phased-array beam patterns. However, contamination of OSCAR returns by simultaneous activation of the CODAR systems is apparent in the data.

DTIC

Diurnal Variations; Internal Waves; Monterey Bay (CA); Tides

19980016140 Hughes Aircraft Co., Fullerton, CA USA

Invehicle Safety Advisory and Warning System (IVSAWS), Volume 1, Executive Summary Final Report, Sep. 1990 - Sep. 1994

Shirkey, K., Hughes Aircraft Co., USA; Mayhew, G., Hughes Aircraft Co., USA; Casella, B., Hughes Aircraft Co., USA; Mar. 1996; 39p; In English

Report No.(s): PB96-177233; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Invehicle Safety Advisory and Warning System is a Federal Highway Administration program to develop a nationwide vehicular information system that provides drivers with advance, supplemental notification of dangerous road conditions using electronic warning zones with precise areas of coverage. The goal is to ameliorate the severity of scenarios that are particularly hazardous and have remained hazardous despite traditional crash-reduction techniques such as mechanical signing. This system provides additional safety by enhancing the real-time interaction between the general driving public and professional agencies. While appropriate for both urban and rural settings, the primary focus of IVSAWS is the rural transportation environment. The IVSAWS program investigated techniques to provide drivers with advance notice of safety advisories and hazard warnings to that drivers are able to take appropriate action to reduce the severity of such situations.

NTIS

Highways; Information Systems; Safety

19980016144 NERAC, Inc., Tolland, CT USA

Data and Voice Packets in Communication Systems. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863774; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning packet transmitting, switching, and receiving techniques in data and voice communications. Data and speech packet transmitting and switching devices and methods, logic design, and data flow control systems are discussed. Packet switched broadcast and telephone systems are considered. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Packets (Communication); Data Transmission

19980016147 Rennes Univ., Lab. Antennes et Reseau, France

Large Bandwidth Planar Array Antennas with Dual Polarisation. Polarimetric Investigation *Reseaux d'Antennes Large Bande a Bipolarisation. Caracterisation Polarimetrique*

Dubost, G., Rennes Univ., France; 1995; 20p; In French; 13th; Biennial Colloquium: Hertzian Optics and Dielectrics, 6-8 Sep. 1995, Zaragoza, Spain

Report No.(s): PB96-126636; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Instruments are mainly devoted to the acquisition of data bases which could be used to develop algorithms based on coherent information between several linear polarized signals instead of using only the power measurements. In France the CRPE and Thomson-CSF have developed a polarimetric FM/CW, X band radar mounted on small helicopter. One of the main problems was to validate the instrument calibration in phase and amplitude by means of various targets. A dual orthogonal polarization antenna was studied and manufactured in cooperation between University of Rennes and the LCTAR at Velizy-Villacoublay. The antenna which acts between 9.55 and 9.75 GHz is composed of 144 square metallic patches each fed by two crossed triplate lines through two longitudinal and orthogonal slots. The antenna is divided into 24 subarrays.

NTIS

Antenna Arrays; Continuous Wave Radar; Polarimetry

19980016542 National Inst. of Standards and Technology, Electromagnetic Technology Div., Boulder, CO USA

Metrology for Electromagnetic Technology: A Bibliography of NIST Publications

Bradford, A. G., National Inst. of Standards and Technology, USA; Sep. 1995; 81p; In English

Report No.(s): PB96-128269; NISTIR-5040; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This bibliography lists the publications of the personnel of the Electromagnetic Technology Division of NIST during the period from January 1970 through the publication of this report. A few earlier references that are directly related to the present work of the Division are also included. This edition of the bibliography is the first since the Electromagnetic Technology Division split into two Divisions, and it includes publications in cryoelectronic metrology and superconductor and magnetic measurements. The optical electronic metrology section found in earlier editions is now being produced separately by the new Optoelectronics Division of NIST. That companion bibliography to this publication is NISTIR 5041.

NTIS

Bibliographies; Metrology; Magnetic Measurement; Cryogenics; Superconducting Devices

19980016545 Federal Communications Commission, Washington, DC USA

FCC Record: A Comprehensive Compilation of Decisions, Reports, Public Notices and Other Documents of the Federal Communications Commission of the USA Volume 10, Number 26, Pages 13606 to 14176, Volume 10, 11-22 Dec. 1995

1996; 583p; In English

Report No.(s): PB96-153515; No Copyright; Avail: CASI; A25, Hardcopy; A06, Microfiche

The publication is a comprehensive compilation of decisions, reports, public notices and other documents of the Federal Communications Commission of the USA.

NTIS

Regulations; Radio Equipment; Satellite Communication; Radio Communication

19980016556 NERAC, Inc., Tolland, CT USA

Videoconferencing and Videotelephones. (Latest Citations from the Ei Compendex*Plus database)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863766; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning videoconferencing and the implementation of videotelephone systems in telecommunication networks. Concept reviews, system development and evaluation, coding schemes, transmission bandwidth, and applications for business conferences are treated. Switching concepts and applications for the handicapped are also considered. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Teleconferencing; Video Communication

19980016558 NERAC, Inc., Tolland, CT USA

Fiber Data Distributed Interface (FDDI). (Latest Citations from the INSPEC Database)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863741; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the proposed American National Standard Institute (ANSI) standard for the 100 MB/S fiber data distributed interface (FDDI), a fiber-based local area network. Applications in voice/data networks, trends in FDDI development and implementation, and connectivity considerations are among the topics discussed. Some attention is given to theoretical considerations and modeling of FDDI networks. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Local Area Networks; Fiber Optics

19980016559 NERAC, Inc., Tolland, CT USA

Infrared Communications. (Latest Citations from the INSPEC Database)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863725; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the use of infrared light in communication. Subjects include the design and implementation of optical communication systems. Wireless local area network (LAN) technology is discussed, as well as the properties, applications, and performance of infrared sources, detectors, and transmitting materials. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Optical Communication; Infrared Radiation

19980016575 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. fuer Hochfrequenztechnik, Oberpfaffenhofen, Germany

Airborne and Spaceborne SAR Systems: Possibilities and Limitations for Military Use

Keydel, Wolfgang, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 10p; In English; Also announced as 19980016571; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

Synthetic Aperture Radar (SAR) is perfectly suited for aerospace surveillance and reconnaissance systems. In principal, SAR combines the advantages of microwave systems like weather independence, optical visibility, penetration capability. The state of the art as well as the development of technique and technologies needed and possibilities of future systems will be shown briefly.

Author

Synthetic Aperture Radar; Space Surveillance (Spaceborne); Aerial Reconnaissance; Radar Detection; Radar Equipment

19980016576 Royal Military Academy, Dept. of Electricity/Telecommunications, Brussels, Belgium

Ultra-Wide-Band Techniques and their Practical Uses *Techniques a Bande Ultra-Large et Applications*

Piette, Marc, Royal Military Academy, Belgium; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 14p; Summary translated by Schreiber; In French; Also announced as 19980016571; Copyright Waived; Avail: CASI; A03, Hardcopy; A02, Microfiche

The purpose of this communication is to present an introduction to ultra-wide-band radars and their technology. After defining the terminology inherent in these new radars and describing it specifically, we describe the form of the signals they emit by comparing them -- in terms of time and frequency -- to the signals that are emitted by the conventional radars. We then move on to a review of the various types of transmitters that can be used, the specific antennas that were developed recently, and the possible structures of the receiver. Finally, we briefly present the techniques of analysis and processing of signals that are specifically related to nonsinusoidal and pulse signals, before stating some conclusions as to future prospects.

Transl. by Schreiber

Broadband; Signal Analysis; Telecommunication; Signal Processing; Radar Equipment

19980016577 Otto-von-Guericke Univ., Magdeburg, Germany

High-Power Microwaves Effects on Smart Electronic Weapon Systems

Nitsch, J., Otto-von-Guericke Univ., Germany; Bohl, J., Diehl G.m.b.H. und Co., Germany; Straehle, U., Ministry of Defence, Germany; Kaiser, A., German Armed Forces Scientific Inst. for Protection Technologies, Germany; Meyer, L., German Armed Forces Scientific Inst. for Protection Technologies, Germany; Vogel, H. J., German Armed Forces Scientific Inst. for Protection Technologies, Germany; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 14p; In English; Also announced as 19980016571; Original contains color illustrations; Copyright Waived; Avail: CASI; A03, Hardcopy; A02, Microfiche

In this paper we describe the coupling of microwaves to smart electronic weapon systems. Analytical and numerical calculations of an almost real model of a weapon system give a first idea concerning the results of a strong interaction of an electromagnetic wave with the system under consideration. Subsequent experiments with the passive system confirm the expected results and/or add new, sometimes unexpected ones to the former. They together form the basis for the final tests with the active smart system. Whereas the passive tests mainly are performed with low power excitation in the cw-modus, experiments with the active system are conducted with quite different power levels and the variation of many other HPM-parameters. The magnitudes of the perturbation quantities inside the system are measured and stored and serve as input data for a flightpath simulation program. With the aid of such a program one can make a prediction whether or not the smart weapon system can fulfill its mission. It is shown that interferences lasting longer than about 1.5 s lead to mission interruption. Hardening and defense aspects are discussed at the end of the paper.

Author

Weapon Systems; Electronic Warfare; Mathematical Models; Microwaves; Simulation; Military Technology

19980016578 Thomson-CSF, Radars and Contre-Mesures, Elancourt, France

Trends in Airborne Electronic Warfare: A European Perspective

Baratault, P., Thomson-CSF, France; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 8p; In English; Also announced as 19980016571; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

Electronic warfare is one of the areas in which each major nation has tried to stay largely independent. As the European construction programme continues and budgets shrink, it would be reasonable to assume that this situation is now going to change quite quickly. In any case, the industry must be prepared for this scenario, even if the decisions are basically political. The first point examined in this paper is that electronic warfare should be considered as a whole. It should no longer be approached on a programme-by-programme basis, or just in terms of equipment. On the contrary, our vision of electronic warfare should encompass intelligence gathering (to define the threats), technico-operational simulation (to specify which systems and equipment are needed to deal with the threats), evaluation, tests, and life cycle support. and our approach to electronic warfare should also include all the spectral components of known or predictable threats. A second consideration is that electronic warfare can no longer be dealt with as a separate area of interest. This is partly because of cost constraints, but partly because of the specific technical problems involved in co-siting different systems on board on an aircraft. It is becoming more and more vital to make different systems share technical functions, apertures and time slots. Current developments in modular integrated avionics are moving in this direction. Further efforts are needed in the field of sensors and antennas. The third consideration discussed here is primarily of concern to our industry, but it cannot leave governments indifferent, as what is at stake is Europe's independence. I am talking here of the vital importance of maintaining European capacity in key technologies for which commercial applications cannot yet generate sufficient volume or which have cycle times that are incompatible with military programmes.

Author

Electronic Warfare; Military Technology; Weapon Systems; Costs

19980016579 Royal Military Academy, Signal and Image Centre, Brussels, Belgium

Future Trends in Image Processing and Pattern Recognition

Acheroy, Marc, Royal Military Academy, Belgium; Korn, Axel, Fraunhofer-Inst. fuer Informations- und Datenverarbeitung, Germany; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 10p; In English; Also announced as 19980016571; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

The strong evolution of the scientific background and of the imaging technology is transforming image processing in a discipline where the boundaries between the sensor system, the processing system and the visualization and/or decision making system are vanishing. Indeed, it is more and more difficult to split the design of signal processing algorithms from the design of pattern recognition algorithms or the preprocessing dedicated to the sensor system from the decision making process. Sensor systems are also evolving very fast, their variety increases and their resolution is getting better in all domains (temporal, spatial and wavelength domains). Therefore, they are one of the fundamental reasons for the modern evolution in processing algorithms and hardware design, especially in data fusion and parallel processing. The design of modern pattern recognition systems, that show an intelligent behaviour, has to cope with the huge multiplicity of inputs at different levels. These inputs must be combined and fused in order to extract the useful information and to make possible the decision making. Finally, the computer hardware performance and integration fortunately still increase exponentially so that it still remains possible to implement the more and more sophisticated, real-time or near real-time applications on existing hardware.

Author

Signal Processing; Image Processing; Pattern Recognition; Real Time Operation; Algorithms; Multisensor Fusion

19980016580 Defence Evaluation Research Agency, Radio Science and Propagation Group, Malvern, UK

Real Time Specification of the Battle Space Environment and its Effects on RF Military Systems

Cannon, Paul S., Defence Evaluation Research Agency, UK; Richter, Juergen H., Naval Air Warfare Center, USA; Kossey, Paul A., Phillips Lab., USA; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 12p; In English; Also announced as 19980016571; Original contains color illustrations; Copyright Waived; Avail: CASI; A03, Hardcopy; A02, Microfiche

The critical nature of electromagnetic propagation assessment in the development of a wide range of sensor, communications, and weapon systems is highlighted. A brief description of the Battle Space Environment, together with methods to specify it are given. A number of contemporary decision aids are used to illustrate both the importance of accurate, timely environmental specification, and of accurate ray-tracing, to NATO operations. The importance of using new sensors, data fusion and advanced computer assets is identified.

Author

Electromagnetic Wave Transmission; Real Time Operation; Telecommunication; Radio Frequencies; Atmospheric Effects; Weapon Systems; Wave Propagation; Radio Transmission; Military Operations

19980016581 National Defense Univ., Information Warfare Service, Washington, DC USA

From Information Warfare to Information Power: A New Paradigm for National Security in the Information Age

Kuehl, Dan, National Defense Univ., USA; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 10p; In English; Also announced as 19980016571; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

The passage of the Goldwater-Nichols Act in 1986 generated a new emphasis on "jointness" in the American military. Current concepts of jointness and joint operations are encapsulated in the existing definition found in Joint Publication 1-02, which defines joint as "activities, operations, organizations, etc., in which elements of more than one Service of the same nation participate." The question at hand, however, is whether this concept, centered on blending the operations and capabilities of the four military Services, is sufficient for information warfare (IW) and the needs of National security in the information age. Are the impacts and implications of the information revolution so widespread that they necessitate a new perspective on who should be covered by the umbrella of jointness? The thesis of this paper is that the current Service-focused understanding of jointness is insufficient because it is too narrow, and that a broader and more inclusive concept that incorporates all of the various elements of National information power is necessary.

Author

Armed Forces (USA); Information Systems; Defense Program; Warfare

19980016587 GEC-Marconi Research Centre, Communications and Computing Lab., Chelmsford, UK

Modelling and Simulation of Communication Systems

Alston, I. D., GEC-Marconi Research Centre, UK; Currie, J. C., GEC-Marconi Research Centre, UK; Dearlove, C. M., GEC-Marconi Research Centre, UK; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 12p; In English;

Also announced as 19980016571; Copyright Waived; Avail: CASI; A03, Hardcopy; A02, Microfiche

The design of digital communication systems involves the definition of the system architecture (e.g. network topology, protocols); the design and modelling of the algorithms/behaviour of the system (e.g. signal processing functions); the design of the hardware/software architecture to be employed; and finally, implementation of the algorithms on the chosen architecture. During this design lifecycle the performance of the communications system can be evaluated in three ways, the paper will briefly discuss the characteristics of these methods and highlight when computer modelling/simulation is the best and most efficient way forward in order to gain an understanding of a communication system and an estimate of its performance. The paper will discuss the migration from computer modelling using standard high-level languages such as FORTRAN towards the use of high level design and simulation packages. The paper will show how such a commercially available package was used to model the physical layer of a public air-to-ground telephone system. The paper will also show how the modelling activity was used within the standardization process and how these new tools allow models to evolve easily introducing more and more detail until it represents a very accurate model of the real system. The paper will also show how subsequently the computer model was used to assist in the implementation and testing phase of the project. Finally the paper will discuss the concept of rapid prototyping and its advantages and show how such a modelling tool can also be used to produce prototype equipment.

Author

Pulse Communication; Computerized Simulation; Computer Programs; Algorithms; Communication Networks; Signal Processing; Programming Languages

19980016620 NERAC, Inc., Tolland, CT USA

Horn Antennas. (Latest Citations from the INSPEC Database)

Nov. 1995; In English; Page count unavailable.

Report No.(s): PB96-855242; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, development, fabrication, and evaluation of horn antennas. Citations discuss microstrip, conical, corrugated, dielectric, directive, and diagonal type horn antennas. Applications in broadcasting, aerospace instrumentation, radiation therapy, underground radars, microwave communication, and telecommunication in high interference environments are examined. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Horn Antennas

19980016652 NERAC, Inc., Tolland, CT USA

Optical Switches in Communication Systems. (Latest Citations from the INSPEC Database)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-856141; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the architecture, development, and performance evaluation of optical switches used in optical communication systems. References examine optical fiber materials, integrated optics, and cost-effective analyses of optical switching systems. Optical switches are evaluated with consideration to cross talk, response time, power consumption, insertion loss, and stability. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Optical Switching; Optical Communication

19980016710 NERAC, Inc., Tolland, CT USA

Serial Communication Interface Standard RS422 (Latest Citations from the INSPEC Database)

Nov. 1995; In English; Page count unavailable

Report No.(s): PB96-855127; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, applications, and implementation of the RS-422 Serial Communication Interface Standard. Comparisons with other serial communication interface standards are cited. Circuit descriptions, systems that use RS-422, components used in RS-422 designs, and interface implementations are among the topics discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Interprocessor Communication

19980016752 Naval Postgraduate School, Dept. of Physics, Monterey, CA USA

Solar Heating Effects on Balloon-Borne Microthermal Probes for the Airborne Laser Program

Richardson, Daniel J., Naval Postgraduate School, USA; Jun. 1997; 107p; In English

Report No.(s): AD-A333447; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Atmospheric optical turbulence induces phase fluctuations in a propagating electromagnetic wave. The resulting degradation in coherence limits the capability of any laser, target acquisition, or surveillance system. Past data collection methods for the parameterization of atmospheric turbulence profiles, in support of critical Theater Ballistic Missile Defense (TBM) systems, from ground level to 30 km, have depended on meteorological balloon-thermosonde systems, probes carried on the U.S. Air Force Argus aircraft, as well as radar and optical measurements. The balloon and aircraft systems measure temperature fluctuations and compute the temperature structure function, CT2 and the related index of refraction structure parameter, Cn2. It has recently become critical to explain why turbulence profiles from daytime thermosonde data consistently show a two order of magnitude increase over that taken during the night, primarily between 12-20 km. This thesis analyzed the TSI 3.8 micron platinum coated tungsten thermosonde probe used by the USAF Research Laboratory (AFRL) to quantify the magnitude of the solar heating and to investigate other heat transfer mechanisms in the probe. A model of the thin wire probe was developed to identify each of the contributions to the temperature error and its significance. Experimental measurements were collected to verify most aspects of the final model. We found that the sun induces a temperature rise in the TSI 3.8 micron fine wire probe, during the day, that can vary from near zero to 0.175 K. It is strongly dependent on probe orientation with respect to the sun and on variations in the air flow over the probe. This then causes an apparent increase by two orders of magnitude in the daytime measurements of the optical turbulence parameters CT2 and Cn2.

DTIC

Solar Heating; Airborne Lasers; Atmospheric Turbulence; Data Acquisition

19980016766 Federal Communications Commission, Washington, DC USA

FCC Record: A Comprehensive Compilation of Decisions, Reports, Public Notices and Other Documents of the Federal Communications Commission of the USA. Volume 11, No. 1. Pages 1 to 491, 26 Dec. 1995 - 5 Jan. 1996

1996; 498p; In English

Report No.(s): PB96-153523; No Copyright; Avail: CASI; A21, Hardcopy; A04, Microfiche

The publication is a comprehensive compilation of decisions, reports, public notices and other documents of the Federal Communications Commission of the USA.

NTIS

Communication; Regulations; Telecommunication

19980016784 National Highway Traffic Safety Administration, Washington, DC USA

Planning Emergency Medical Communications, Volume 1, State-Level Planning Guide. National Association of State Emergency Medical Services Directors

Jun. 1995; 112p; In English

Report No.(s): PB96-189725; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Volume One of this planning manual is concerned with development of emergency medical communications systems and state plans, and the role that a state office of emergency medical services (state OEMS) plays in developing these plans. This approach to planning is patterned after the ASTM Standard Guide for Emergency Medical Services System (EMSS) Telecommunications Standards F1220-89. The ASTM standards sets state planning goals and objectives and advocates applying a two-tiered approach for EMSS communications planning. Under the two-tiered approach, a general guide or overall first-tier state plan identifies the communications goals and factors that need to be coordinated statewide. Local second-tier EMSS communications plans are then prepared in accordance with the statewide guideline plan. The local plans are tailored to satisfy local system needs while providing communications compatibility and interoperability with other emergency medical services within the state. This is accomplished by adhering to the compatibility factors provided in the statewide plan.

NTIS

Medical Services; Telecommunication

19980016792 Hughes Aircraft Co., Fullerton, CA USA

Invehicle Safety Advisory and Warning System (IVSAWS), Volume 4, Appendixes I through K (Reference Materials) Final Report, Sep. 1990 - Sep. 1994

Shirkey, K., Hughes Aircraft Co., USA; Mayhew, G., Hughes Aircraft Co., USA; Casella, B., Hughes Aircraft Co., USA; Mar. 1996; 399p; In English

Report No.(s): PB96-177258; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The Invehicle Safety Advisory and Warning System (IVSAWS) is a Federal Highway Administration effort to develop a nationwide vehicular information system that provides drivers with advance, supplemental notification of dangerous road conditions using electronic warning zones with precise areas of coverage. The research study investigated techniques to provide drivers with advance notice of safety advisories and hazard warnings so drivers can take appropriate actions. The technical portion of the study identified applicable hazard scenarios, investigated possible system benefits, derived functional requirements, defined a communication architecture, and made recommendations to implement the system.

NTIS

Warning Systems; Information Systems; Highways; Rapid Transit Systems

19980016796 National Highway Traffic Safety Administration, Washington, DC USA

Planning Emergency Medical Communications, Volume 2, Local/Regional-Level Planning Guide. National Association of State Emergency Medical Services Directors

Oct. 1995; 175p; In English

Report No.(s): PB96-189733; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

Regional-Level Planning Guide, provides more specific information and directions for use by local planners in preparing detailed second-tier local emergency medical telecommunications plans. It is impossible for a document such as this to convey all of the information needed regarding emergency medical communications or to keep up with continuous change in communications technology and regulations. Changes to the Federal Communications Commission's Rules directly influence the system configurations and use of the radio frequency spectrum. The types of equipment offered by manufacturers constantly change, and there also are frequent changes in funding and federal, state and local policies. These all influence the EMS communications-system-design philosophy. EMS communications, as with most modern communications, are being constantly developed and improved. Throughout this document, references are made to the 'state office of emergency medical services', (state OEMS). This generic term refers to the appropriate official agency responsible for regulating emergency medical services within state government.

NTIS

Emergencies; Frequency Distribution; Medical Services; Telecommunication

19980016818 Groningen Rijksuniv., Dept. of Computing Science, Netherlands

Wavelet-Based Signal Approximation with Genetic Algorithms

Lankhorst, M. M., Groningen Rijksuniv., Netherlands; vander Laan, M. D., Groningen Rijksuniv., Netherlands; Aug. 1994; 31p; In English

Report No.(s): PB96-132543; CS-R9409; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this paper, the useability of genetic algorithms for signal approximation is discussed. Due to recent developments in the field of signal approximation by wavelets, this work concentrates on signal approximation by wavelet-like functions. Signals are approximated by a finite linear combination of elementary functions and a genetic algorithm is employed to find the coefficients to such approximation. The algorithm maintains a population of different approximations, encoded in the form of 'chromosomes'. From this population 'parents' are selected according to their 'fitness', and the 'children' that constitute the next generation are produced from these parents using mutation and crossover operators. Fitness functions employed to evaluate different approximations are the L1, L2, L4, and L infinity norms. Experiments are carried out on several test signals, using Gabor and spline wavelets, both to evaluate the quality of different fitness functions, encoding schemes, and operators, and to assess the usefulness of genetic algorithms in the realm of signal approximation. Although other existing methods are faster while providing comparable approximation quality, the algorithm offers a great deal of flexibility in terms of different elementary functions, fitness criteria, etc.

NTIS

Genetic Algorithms; Algorithms; Wavelet Analysis; Signal Processing

19980016845 National Senior Citizens Law Center, Washington, DC USA

Telecommunications and Public Benefit Hearings

Brewer, B. M., National Senior Citizens Law Center, USA; Chiplin, A. J., National Senior Citizens Law Center, USA; Fretz, B. D., National Senior Citizens Law Center, USA; Apr. 1994; 98p; In English

Report No.(s): PB96-182662; Copyright Waived; Avail: CASI; A05, Hardcopy; A02, Microfiche

Conducting administrative hearings by telephone is increasing in Medicare, Social Security, Unemployment Insurance and other benefit programs. While prior research has focused on the utility of telephone hearings, this project focuses on their fairness.

It examines (1) the experience of advocates in California with teleconference hearings, (2) legal requirements of due process that apply, and (3) differences between in-person and telephone hearings identified by an expert in linguistics.

NTIS

Telecommunication; Teleconferencing; Security

19980016854 California Univ., Riverside, CA USA

Gabor Wavelets for Automatic Target Detection and Recognition Final Report, 1 Jun. 1993 - 31 Mar. 1997

Bhanu, B., California Univ., USA; Jones, G., California Univ., USA; Yi, J., California Univ., USA; Ahn, J., California Univ., USA; Zhang, S., California Univ., USA; Apr. 02, 1997; 346p; In English

Report No.(s): PB98-110505; No Copyright; Avail: CASI; A15, Hardcopy; A03, Microfiche

The report describes the work in: (1) Recognition of articulated and occluded targets in SAR images using invariants and stochastic models; (2) Gabor wavelet representation for distortion-tolerant flexible matching for the recognition of occluded and nonoccluded targets in FLIR images; (3) Bayesian approach for the segmentation of SAR images and an approach for automatic model construction from inverse synthetic aperture radar images; (4) Clutter modeling for target detection in FLIR images and computing salient structures in cluttered images; and (5) Gabor wavelet based approaches for target detection in complex multi-model FLIR images.

NTIS

Synthetic Aperture Radar; Target Acquisition; Wavelet Analysis; Infrared Imagery; FLIR Detectors; Pattern Recognition; Radar Imagery; Bayes Theorem

19980016885 Naval Postgraduate School, Monterey, CA USA

Global Broadcast Service for the Expeditionary Warrior

Birch, Elizabeth S., Naval Postgraduate School, USA; Jun. 1997; 105p; In English

Report No.(s): AD-A333435; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The battlefield has changed tremendously during the past decade due to major technical innovations. These changes have resulted in a requirement for high-speed, multimedia communications and greater bandwidth capabilities. Global Broadcast Service (GBS) technology is a military application of the commercial system Direct TV and is one way the military can address the need for greater bandwidth. Many of the two way systems in the MILSATCOM architecture could be relieved of their burden by use of GBS. This thesis focuses on the Marine Corps and how its decision makers can integrate GBS into the existing communications architecture. This is illustrated by using a Marine Expeditionary Unit as an example. This technology meets the warfighters need to have a high data rate, high volume information transfer available. Crucial to the successful integration of GBS into the communications architecture is ensuring that the MEU command ships, and other amphibious vessels in the Amphibious Ready Group, are equipped with the GBS receive suites during MEUs workup and deployment cycle. Finally, command and control issues are discussed and how GBS can expedite the decision making process.

DTIC

Global Tracking Network; Broadcasting; Command and Control; High Speed; Deployment

33

ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry. For related information see also 60 Computer Operations and Hardware and 76 Solid-State Physics.

19980012520 Rutherford Appleton Lab., Chilton, UK

Time Dependent Aspects of the Response of Some Avalanche Photodiodes to Fast Neutron Irradiation

Bateman, J. E., Rutherford Appleton Lab., UK; Stephenson, R., Rutherford Appleton Lab., UK; Apr. 1996; 24p; In English

Report No.(s): PB96-177423; RAL-TR/96-024; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Using the fast neutron flux available from the beam collector on the RAL spallation neutron source (ISI) we have irradiated the two types of avalanche photodiodes (APD) (Hamamatus S5345 (high capacitance) and the EG&G C30626E) up to a maximum fluence of 2×10^{13} neutrons per sq.cm. We report the recovery behavior of the device dark currents and noise characteristics

following exposure to the neutron flux. Using the parameters derived from these observations we model the evolution of the dark current and noise through likely CMS activity schedules.

NTIS

Accumulators; Avalanche Diodes; Irradiation; Neutron Irradiation; Neutron Sources; Neutrons; Schedules; Spallation; Time Dependence

19980012535 Japan Atomic Energy Research Inst., Tokyo, Japan

Parallelization for first principles electronic state calculation program

Watanabe, Hiroshi, Japan Atomic Energy Research Inst., Japan; Oguchi, Tamio, Japan Atomic Energy Research Inst., Japan; Mar. 1997; 36p; In Japanese

Report No.(s): JAERI-Data/Code-97-009; DE97-750695; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this report we study the parallelization for First principles electronic state calculation program. The target machines are NEC SX-4 for shared memory type parallelization and FUJITSU VPP300 for distributed memory type parallelization. The features of each parallel machine are surveyed, and the parallelization methods suitable for each are proposed. It is shown that 1.60 times acceleration is achieved with 2 CPU parallelization by SX-4 and 4.97 times acceleration is achieved with 12 PE parallelization by VPP 300.

DOE

Parallel Processing (Computers); Atomic Structure

19980012548 NERAC, Inc., Tolland, CT USA

Military Standard 883: Test Methods and Procedures for Microelectronics. (Latest citations from the INSPEC Database)

Jan. 1996; In English

Report No.(s): PB96-859608; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the testing of microelectronic circuits to military specifications. Citations focus on testing methods for hermeticity, thermal shock, temperature cycling, salt spray, ESD, x-ray inspection, total dose, and wire bond certification. Flip chip resistors, MOSFETS, CMOS integrated circuits, multichip modules, space-based circuits, and hybrid microcircuits are devices discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Microelectronics; Performance Tests

19980012717 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Open Question: Will the Properties of Electromigration and Thermomigration Have an Adverse Effect on the Future of Asynchronous Logic Design?

Lloyd, L., Newcastle-upon-Tyne Univ., UK; Apr. 1997; 18p; In English

Report No.(s): PB97-176721; TRS-570; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The question is asked whether or not Electromigration and/or Thermomigration, phenomena that are both well known to cause the degradation of the physical structure of electronic circuits, will have serious consequences for the future research, development and application of asynchronous logic devices. A non-rigorous answer to this question is presented that describes how the nature of asynchronous design, which in only performing useful work when processing actions dictate, will have the effect of causing temperature discontinuities to arise in that logic. This is a factor that increases the rate at which electromigration and thermomigration effects are known to occur and has serious implications for the lifetime operability of asynchronous devices as opposed to equivalent synchronous machines. A comparison is made between two hypothetical processors, one synchronous, the other asynchronous, in order to support this argument.

NTIS

Thermomigration; Electromigration; Logic Circuits; Asynchronous Transfer Mode; Reliability Analysis

19980013147 Gesamthochschule, Kassel, Germany

InterNational IEEE Workshop on Experimentally Based FET Device Modelling & Related Nonlinear Circuit Design

Jul. 1997; 316p; In English, 17-18 Jul. 1997, Kassel, Germany; Sponsored by Institute of Electrical and Electronics Engineers, USA; Supported in part by the Hewlett-Packard GmbH, Boblingen, Germany; and Hessian Federal State Government, Wiesbaden, Germany.

Report No.(s): AD-A331468; No Copyright; Avail: CASI; A14, Hardcopy; A03, Microfiche

Topics considered include: DC/SS- Device Characterization & Parasitics; Poster Opening; Signal Waveform and Pulsed Measurement & Load Pull; Noise Measurement & Nonlinear Noise in FETs; Optical Control of FETs; and Nonlinear Modeling and Circuit Design;

DTIC

Field Effect Transistors; Conferences; Models

19980013150 Research and Development Association for Future Electron Devices, Tokyo, Tokyo, Japan

FED Journal, Volume 6

Sugano, T., Editor, Toyo Univ., Japan; Mar. 15, 1996; 67p; In English

Report No.(s): PB96-176169; Copyright Waived; Avail: CASI; A04, Hardcopy; A01, Microfiche

;Table of Contents: Preface: The Silicon Age; Special Issue: Quantum Functional Devices; Prospects for Research on Quantum Dots and Single-Electron Transistors; Excitonic Polaritons and Their Application to New Functional Devices; Progress of QFD Project at Each Companies; (1) Present Status of Quantum Functional Device Project; (2) Development of Surface Tunnel Transistors and Future Prospects for Quantum Functional Circuits; (3) Recent Research on Quantum Functional Devices in Sony; Papers: Realization of Molecular Optical Devices using Bacteriorhodopsin; Surpassing Computational Limits with Bioelectronic and Molecular Electronic Technologies: Towards the Multiscale Computational Architecture; Laboratories(1)--Mitsubishi Chemical Corp; Laboratories(2)--OMURON Corp; Research and Development Association for Future Electron Devices Award. NTIS

Electronic Equipment; Optical Equipment; Photoreceptors; Polaritons; Proteins; Quantum Dots; Transistors

19980013664 Rensselaer Polytechnic Inst., Troy, NY USA

Advanced Workshop on Frontiers in Electronics WOFE 1997 Final Report, 23 Dec. 1996 - 22 Dec. 1997

Shur, Michael, Rensselaer Polytechnic Inst., USA; Oct. 1997; 162p; In English

Contract(s)/Grant(s): DAAG55-97-I-0016

Report No.(s): AD-A332248; ARO-36426.1-EL-CF; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

The goal of this Workshop was to bring together leading scientists and engineers who are at the frontiers of electronic device and circuit research and development but who approach this technology from entirely different directions. Low powered digital electronics, microwave powered circuits, and optoelectronics have become the foundation of today's electronics technology and seem to represent the directions for future endeavors, yet they emerged from traditionally separated fields and are still largely pursued by specialists trained in different areas. The rapid pace of electronic technology evolution is propelling a merger of the traditional fields. Evidence is not hard to find around us. Wireless communication is just one example. It is time to encourage active cross-fertilization of the different "species" on this electronic planet and to call for leadership in bringing together the resources and expertise in these fields. This advanced workshop was a special forum to gather some of the creative minds and leading experts from academia, industry, and government, and to review the most recent and exciting breakthroughs in the various fields, the underlying physical mechanisms that link these advancements, and to exchange views on future trends and directions, the market pulls and the necessary polity and infrastructure changes. Not only different overlapping fields were represented at the Workshop but also different countries, including Canada, Great Britain, France, Germany, Iceland, Japan, Norway, Russia, Spain, and the U.S.

DTIC

Digital Systems; Electronic Equipment; Conferences

19980013665 Rensselaer Polytechnic Inst., Dept. of Electrical, Computer, and Systems Engineering, Troy, NY USA

1997 Advanced Workshop on Frontiers in Electronics, WOFE'97 Final Report

Pomrenke, Gernot S., Editor, Rensselaer Polytechnic Inst., USA; Schuermeyer, Fritz, Editor, Rensselaer Polytechnic Inst., USA; Shur, Michael, Editor, Rensselaer Polytechnic Inst., USA; Xu, Jimmy, Editor, Rensselaer Polytechnic Inst., USA; Jan. 1997; 161p; In English; Frontiers in Electronics, WOFE'97, 6-11 Jan. 1997, Puerto de la Cruz, Spain

Contract(s)/Grant(s): N00014-97-1-0030

Report No.(s): AD-A331939; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

The goal of this Workshop was to bring together leading scientists and engineers who are at the frontiers of electronic device and circuit research and development but who approach this technology for entirely different directions. The Workshop sessions included a Digital, Microwave, and Mixed Signal Session, an Optoelectronics Session, and a Future Direction Session. In addition to poster sessions, plenty of time was reserved for informal discussions and ad hoc poster sessions. This fostered a spirit of intellec-

tual discourse, presented opportunities for the exchange of ideas and points of view, and hopefully gave the starting point for many future collaborations.

DTIC

Field Effect Transistors; Infrared Detectors; Semiconductor Lasers; Conferences

19980014091 National Inst. of Standards and Technology, Electromagnetic Fields Div., Boulder, CO USA

Relative Permittivity Measurement of Rectangular Copper-Laminated Substrates Using the Full-Sheet Resonance Technique

Lewis, R. L., National Inst. of Standards and Technology, USA; Apr. 1997; 28p; In English

Report No.(s): PB97-167472; NISTIR-5062; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A measurement program has been undertaken at NIST to evaluate the full-sheet resonance (FSR) technique, from which consistent relative permittivity values have been obtained. We present an analysis of the theory underlying the FSR technique, along with a theoretical formulation correcting full two-port scattering-matrix measurements of a resonant cavity for the effects of coupling between the external measurement circuit and the cavity. A circuit analysis modeling the resonant cavity and its external circuit is presented, along with a least-squares solution for the resonant cavity's primary resonance parameters. The least-squares analysis features a slight rearrangement of an earlier formulation leading to a more numerically stable solution. An even earlier solution for a resonant cavity's unloaded quality factor, also using a least-squares solution to obtain a coupling correction, is presented for comparison.

NTIS

Laminates; Permittivity; Substrates; Copper; Coupling Coefficients; Resonance Scattering

19980014219 NERAC, Inc., Tolland, CT USA

Soldering Electronics (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-862560; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning the soldering of electronic circuits and circuit boards. References to solder resists, pastes, joints, masks, connections, interconnections, and reflow processes are presented. Citations also cover substrate surface treatment, high-density circuit soldering, soldering of surface mount components, microelectronics packaging, and solderability assessment. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Soldering; Microelectronics

19980014444 NERAC, Inc., Tolland, CT USA

Ceramic Capacitors. (Latest citations from the Ei Compendex*Plus database)

Jan. 1996; In English

Report No.(s): PB96-859335; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the manufacture, properties, and applications of ceramic and ceramic-chip capacitors. Topics include the electric and dielectric properties, failure, reliability, stability, and nondestructive testing of ceramic capacitors. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Capacitors; Ceramics

19980014455 NERAC, Inc., Tolland, CT USA

Fluorescent Lighting. (Latest citations from the Energy Science and Technology Database)

Jan. 1996; In English

Report No.(s): PB96-859822; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning energy savings and improved reliability through use of fluorescent lighting systems. New designs with fewer components and simpler circuitry are presented. The references discuss methods for retrofitting

older fluorescent lighting systems with new electronic ballasts, and evaluate test reports and energy saving claims of 30 to 40 percent. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Fluorescence; Lighting Equipment; Illuminating; Bibliographies; Energy Technology

19980014818 California Univ., Electronics Research Lab., Berkeley, CA USA

JSEP Augmentation Proposal: Velocity Overshoot in Silicon Inversion Layer Final Report, 1 Jul. 1994 - 30 Jun. 1997

Bokor, Jeffrey, California Univ., USA; Hu, Chen-Ming, California Univ., USA; Aug. 31, 1997; 4p; In English

Contract(s)/Grant(s): F49620-94-I-0388; AF Proj. 3484

Report No.(s): AD-A329780; UCB/ERL-97/1; AFOSR-TR-97-0410; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The transport properties of carriers in the inversion layer was studied by using the thick-gate uniform channel field MOS transistor. Using devices with sub-100nm channel lengths, we performed an extensive investigation of ballistic transport in inversion layer under uniform field condition. We experimentally address the effect of a wide range of parameters on the high-field transport of Inversion layer electrons and holes. Our findings point to electron velocity overshoot at room temperature, dependence of electron and hole saturation velocities on nitridation of the gate oxide, dependence of the high-field drift velocity on the effective vertical field, and relative insensitivity of electron and hole mobility and saturation velocity to moderate surface roughness.

DTIC

Electron Beams; Electron Mobility; Hole Mobility; Room Temperature; Surface Roughness; Temperature Dependence; Transistors; Transport Properties

19980015136 Texas Technological Univ., Pulsed Power Lab., Lubbock, TX USA

High Power Microwave Generator Final Report, 15 May 1993 - 14 May 1997

Kristiansen, M., Texas Technological Univ., USA; Hatfield, L. L., Texas Technological Univ., USA; Woolverton, Kevin, Texas Technological Univ., USA; Jul. 1997; 33p; In English

Contract(s)/Grant(s): F49620-93-I-0203; AF Proj. 2301

Report No.(s): AD-A329658; AFOSR-TR-97-0454; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The purpose of this contract was to build, test and study the coaxial vircator. A study of the efficiency of a coaxial virtual cathode oscillator is presented. The coaxial geometry has many physical parameters that can be changed to alter performance. These parameters include tile placement of an annulus cut in the anode base, the polarity of the system, and the variation of tile applied voltage. The annulus creates a decelerating field for the electrons and tends to keep them in tile right phased region of the virtual cathode. The annulus is varied in width and in position from the center line with the results normalized to the no annulus geometry. The results for a positively and negatively pulsed system, and the results of changing the applied voltage are also given. Comparisons of frequency, efficiency, and particle dynamics of the positively and negatively pulsed systems are given. MAGIC, a 2 1/2 dimensional particle-in-cell code, and SOS a 3 dimensional particle-in cell code, are used to simulate the different geometries.

DTIC

Electric Generators; Electric Potential; Electrons; Frequencies; Microwaves; Oscillators

19980015145 Ohio State Univ., Columbus, OH USA

Integrated Circuits for Distributed Control-(AASERT FY91) Final Report, 15 Jun. 1992 - 14 Oct. 1995

Ozguner, U., Ohio State Univ., USA; Jan. 1996; 30p; In English

Contract(s)/Grant(s): F49620-92-J-0299

Report No.(s): AD-A329716; AFOSR-TR-97-0475; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

The central focus of the effort on this project has been the development of analog VLSI circuit models intended for use in distributed, model-based control of vibrations for flexible structures. The availability of piezo strain elements and memory alloys has created the possibility for actively controlled composite structures in which actuation is integrated with the structure. The advances in miniaturization of analog VLSI circuits allow analog models, controllers, and observers to be embedded directly on flexible structures with little increase in weight 1, 2, 3. Thus, a chip model of a substructure could be integrated directly into the

controller and embedded in the substructure with the actuation. The research presented in this report has involved designing analog models of flexible structures for applications involving sophisticated embedded control applications.

DTIC

Composite Structures; Very Large Scale Integration; Active Control; Analog Circuits; Model Reference Adaptive Control; Vibration; Substructures

19980015158 Advanced Technology and Research, Inc., Burtonsville, MD USA

Testing Lithium/Carbon Monofluoride Batteries for Naval Applications Final Report, Jun. 1992 - Feb. 1994

Zoski, Glenn, Advanced Technology and Research, Inc., USA; Mar. 1996; 29p; In English

Report No.(s): AD-A331288; NSWCCARDIV-TR-96/003; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This investigation was part of a continuing effort to identify or develop battery technology having higher voltage, good rate capability, improved safety, cost effectiveness and easy disposal. Perceived safety risks and storage problems have limited use of lithium batteries by the Navy. This study evaluated the performance of Panasonic Model BR-C lithium/carbon monofluoride batteries over a wide temperature range. Battery rate limitation and the discharge mechanism were also investigated. Four sets of batteries, three batteries per set, were discharged at temperatures of -20, 0, 25 and 70 deg C respectively. The batteries were discharged under constant load conditions of 5 and 50 ohms. Environmental chambers were used to maintain temperature control. Performance at room temperature and above was quite good and the reproducibility of the battery discharge behavior was excellent. Low temperature performance was poor, especially at the higher discharge rate. An unexplained temperature excursion occurred on batteries discharged at -20 deg C, raising a potential safety concern. A better understanding of the discharge mechanism requires collection of impedance data throughout the discharge process. The effects of the spirally-wound construction could be accounted for if a prismatic version of the LiCFx battery were constructed and used for the impedance measurements.

DTIC

Construction; Cost Effectiveness; Data Acquisition; Electric Batteries; Electric Potential; Impedance Measurement; Loads (Forces); Low Temperature; Room Temperature

19980015202 California Univ., Electronics Research Lab., Berkeley, CA USA

CNN Universal Chip Final Report, 1 Sep. 1995 - 31 Aug. 1997

Bokor, J., California Univ., USA; Chua, Leon, California Univ., USA; Oct. 31, 1997; 7p; In English

Contract(s)/Grant(s): F49620-93-I-0519

Report No.(s): AD-A331279; UCB/ERL-97/1; AFOSR-TR-97; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The goal of designing and building a high performance CNN Universal Machine integrated circuit with demonstrable image processing capabilities was achieved during the contract funding period. The design of the CNN Universal Chip architecture was conducted under the guidance of theoretical results explicating the robust elemental processing capabilities of such cellular analog hardware, which were developed under this contract. Furthermore, the analogic algorithms needed for implementing the specific image processing techniques required in several target application areas were designed.

DTIC

Image Processing; Integrated Circuits

19980015230 NERAC, Inc., Tolland, CT USA

Heat Dissipation for Printed Circuit and Printed Wiring Boards and Cards. (Latest Citations from the INSPEC Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864129; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning techniques, devices, and materials for dissipating heat from printed circuit and printed wiring boards, cards, and assemblies. Thermal analyses of boards, cards, and assemblies include studies of performance, efficiency, and thermal properties and characteristics. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Printed Circuits; Cooling

19980015236 NERAC, Inc., Tolland, CT USA

Optical Emissions and Semiconductors. (Latest Citations from the INSPEC Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864491; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the emission of semiconductors. Among the semiconductor materials studied are gallium arsenide, gallium, zinc sulfide, zinc blends, quantum wires, silane argon, and hexafluoroethane. Lateral quantization in the optical emission of barrier-modulated wires and application of optical emission diagnostics and control related to semiconductor processing are examined.

NTIS

Bibliographies; Semiconductors (Materials); Light Emission

19980015330 Nippon Electric Co. Ltd., Tokyo, Japan

NEC Research and Development: Special Issue on Low-Power Electronics, Volume 36

Jan. 1995; 257p; In English

Report No.(s): PB96-129697; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

With multimedia terminals, peripheral components, such as displays, disk drives, etc., are also important. Power saving technologies for components are also essential to realize energy saving portable terminals. This special issue presents recent activities in low-power electronics technology. Trends in low-power electronics technology are reviewed first. Silicon LSIs, circuits, designing and device technologies, and compound semiconductor device technologies are described. Technologies for low-power devices such as TFT-LCDs, CRT displays, CD-ROM drives, etc. are presented. Future device technologies are also discussed. The ongoing low-power electronics technology development will certainly be a key factor in providing customers with better products and ever greater satisfaction in the years to come.

NTIS

Multimedia; Technology Assessment

19980015341 Electrotechnical Lab., Sakura, Japan

Bulletin of the Electrotechnical Laboratory, Vol. 59

Jun. 1995; 65p; In Japanese; Portions of this document are not fully legible

Report No.(s): PB96-128640; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Contents include the following: Multipurpose Protocol Mediation System: DeleGate; A Software Platform for Multimedia Applications; In-plane Refocusing of a Microtips Electron Beam by a Surrounding Ring; Inductive Impedance of Spiral Wound Cylinder Type Battery; and Abstracts of Published Papers.

NTIS

Electron Beams; Impedance; Multimedia; Protocol (Computers); Applications Programs (Computers); Research and Development

19980015356 National Defence Research Establishment, Avdelningen foer Sensorteknik, Linkoeeping, Sweden

Development of an Active mm-Wave Sensor: MMS3.2B Progress Report

Svedin, J., National Defence Research Establishment, Sweden; Hagel, O. J., Industrial Microelectronics Center, Linkoeeping, Sweden; May 1997; 27p; In English

Report No.(s): PB97-206916; FOA-R-97-00498-314-SE; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This document reports some of the results obtained during the time period December 1996 to April 1997. A preliminary study has been carried out concerning the possibility to design and manufacture a 94 GHz modular 8 x 8 focal plane array using the earlier developed hybrid fabrication technology with resistive InP HEMT mixers mounted on the chip surface and staircase vias to ground. Electromagnetic simulations of subarrays indicate that the performance of a prototype array should be adequate for the intended imaging application. A method compatible with the earlier developed MCM process has been developed for embedding active devices in etch holes in the Si substrate using BCB as both glue and filler. A 1 mm x 2 mm InP MMIC was successfully embedded. Experimental studies of a new mixer topology have shown very good results at X-band. This mixer has a much higher conversion efficiency and requires a significantly lower pumping power than the resistive mixer. The staring mm-wave sensor array is developed for use in the IR/mm multisensor project.

NTIS

Energy Conversion Efficiency; Focal Plane Devices; High Electron Mobility Transistors; Imaging Techniques; Integrated Circuits; Microwave Circuits; Millimeter Waves; Prototypes

19980015406 NERAC, Inc., Tolland, CT USA

Programmable Logic Devices. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864814; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning programmable logic devices and components. Logic cells, blocks, modules, arrays, switch matrices, and allocators are described. References cover sense amplifiers, flexible cell structures, array cell partitioning, voltage level translation, optical logic devices, user-interconnection circuits, optical logic devices, and spare parts for use in replacing defective circuits. (

NTIS

Bibliographies; Logic Circuits; Matrices (Circuits); Optical Equipment; Switching Circuits

19980015431 Naval Postgraduate School, Monterey, CA USA

High Frequency Characterization of the Gsanger LM0202P Electro-Optic Modulator

Tucker, John R., Naval Postgraduate School, USA; Dec. 1996; 53p; In English

Report No.(s): AD-A331067; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This thesis documents experiments conducted with the Gsanger LM0202P electro-optic modulator to achieve a high percentage modulation at 125 MHz of an argon-ion laser. The laser was tuned to produce a single mode, linearly polarized light at 514.5 nm. The laser light was first passed through the electro-optic crystal modulator with no external electric field applied, and the frequency spectrum was observed to be the same as the frequency spectrum of the source laser. When an AC voltage with a frequency of 125 MHz was applied to the modulator sidebands were observed by using a Fabry-Perot interferometer. Further measurements were taken to determine the suitability of the LM0202P modulator over a large frequency range.

DTIC

High Frequencies; Electro-Optics; Modulators

19980015432 National Inst. of Standards and Technology, Electricity Div., Gaithersburg, MD USA

NIST Measurement Assurance Program for Capacitance Standards at 1 kHz

Chang, Y. M., National Inst. of Standards and Technology, USA; Mar. 1996; 27p; In English

Report No.(s): PB96-172333; NIST/TN-1417; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The document describes the capacitance Measurement Assurance Program (MAP) service at the National Institute of Standards and Technology (NIST). This service, which uses a commercial digital capacitance meter as the transport standard, provides calibration for capacitance standards at both the 1000 pF and 100 pF levels, at a frequency of 1 kHz. In contrast to the normal MAP, where the transport standards are measured by the client laboratory, the capacitance MAP involves measurements performed on 'dummy' standards by both the Meter (transport standard) and the laboratory capacitance measuring system. Measurement procedures and requirements for client laboratories are included. Also presented are error analysis, assigned values, and equations to estimate the combined uncertainties of the assigned values.

NTIS

Capacitance; Measuring Instruments; Calibrating; Measure and Integration; Quality Control

19980015542 NERAC, Inc., Tolland, CT USA

Magnetron Sputtering Applications. (Latest Citations from the INSPEC Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864251; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the electrical and optical properties of magnetron sputtered films using various techniques and applications. The design of magnetron sputtering systems offering better coating uniformity, adhesive strength, and higher sputtering speeds is also discussed. Topics include usage of various gases, discharge voltages, deposition pressures, temperature ranges, and compressed magnetic field techniques. Preparation procedures, microsphere sticking, and thermal stresses are presented.

NTIS

Bibliographies; Sputtering; Thin Films; Magnetrons; Electrical Properties; Optical Properties

19980015621 National Inst. of Standards and Technology, Gaithersburg, MD USA

Analysis of Proposals for Compliance and Enforcement Testing under the New Part 431; Title 10, Code of Federal Regulations

Stricklett, K. L., National Inst. of Standards and Technology, USA; Vangel, M., National Inst. of Standards and Technology, USA; Nov. 1997; 42p; In English

Report No.(s): PB98-110257; NISTIR-6092; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report analyzes various criteria and sampling plans proposed for establishing compliance with the nominal full-load efficiency levels prescribed by the Energy Policy and Conservation (EPCA). The report discusses, in detail, two proposals: (1) the Notice of Proposed Rulemaking (NPR) for electric motors published in the Federal Register on November 27, 1996; and (2) a proposal prepared by the National Electrical Manufacturers Association (NEMA), Motor and Generator Section, which was submitted in response to the call for public comment given in the NPR. This report evaluates the operating characteristics of these proposals in the context of the EPCA requirements.

NTIS

Electric Motors; Energy Policy; Regulations; Conservation Laws

19980015637 Northrop Grumman Corp., Science and Technology Center, Pittsburgh, PA USA

HTS Films and Multilayers for Electronics Final Report, 20 Feb. 1994 - 19 Feb. 1997

Talvacchio, John, Northrop Grumman Corp., USA; Apr. 10, 1997; 262p; In English

Contract(s)/Grant(s): F49620-94-C-0021; AF Proj. 2305

Report No.(s): AD-A329662; AFOSR-97-0304TR; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

This program established a materials and fundamental device base for an integrated circuit fabrication process for HTS digital electronics based on edge SNS Josephson junctions. The process was qualified by demonstration of small-scale single flux quantum (SFQ) logic circuits fabricated for the first time in an extendible configuration which integrated junctions and HTS groundplanes. Junction materials properties were investigated which affect the reproducibility of critical currents and, ultimately, the scale of circuit integration. Materials properties included the cumulative roughness of multilayer film structures, oxygen mobility in junction electrodes, second-phase precipitates, and crystalline orientation of junction edges. Processing steps investigated in detail included film deposition techniques, parameters, and composition; ion milling angles, gas compositions, and edge profiles; film edge morphology, clensing, and film coverage; groundplanes over and under junctions; groundplane oxidation and magnetic penetration depths; and use of epitaxial buffer layers, protective cap layers, and low-loss insulations. Technology developed under this program was transferred to an Air Force WL/ML program where the junctions were optimized with critical current spreads reduced from 1-sigma values of 30% early in the program to 12% by the program's conclusion. Progress is also reported on tasks which address problems fundamental to the understanding of the superconducting state in HTS films, the application of HTS films in passive microwave circuits, and the development of new superconducting devices.

DTIC

Crystallinity; Digital Electronics; Electrodes; Epitaxy; Gas Composition; Insulation; Integrated Circuits; Ionized Gases; Josephson Junctions; Logic Circuits; Microwave Circuits

19980015646 Hughes Research Labs., Malibu, CA USA

Fast Response Liquid Crystals for Electro-Optic Applications Final Report, 15 Sep. 1994 - 14 Sep. 1997

Wu, S. T., Hughes Research Labs., USA; Sep. 1997; 21p; In English

Contract(s)/Grant(s): F49620-94-C-0078; AF Proj. 6151

Report No.(s): AD-A330668; HAC-REF-K0267; AFOSR-TR-97-0529; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The objectives of this program are (1) to develop low voltage and high birefringence LC mixtures, (2) to develop negative dielectric anisotropic LC materials for high contrast display and wide-band infrared scene projectors, and (3) to deliver sample mixtures to device teams for testing. In the effort of developing high birefringence and low voltage LC mixtures for laser communications, we discovered some nitro-amino tolane dyes with very large dielectric anisotropy and relatively low viscosity. Adding 10% of this guest to the nonpolar diphenyl-diacetylene host, the threshold voltage drops from 4.0 to 1.5 V(rms). In the meantime, these new compounds possess a relatively low viscosity so that they do not increase the response time too noticeably. In the effort of developing negative dielectric anisotropy LC compounds, we have designed and synthesized (collaborated with Chiao Tun University) several laterally fluorinated tolanes and diacetylenes. These LC compounds exhibit a large but negative dielectric anisotropy. They are useful for high contrast displays and for wide-band infrared scene projectors. We have delivered sample mixtures

to Raytheon Lexington Labs, Kent State University, and MacroVision Communication for testing their laser beam steering, low voltage display and fiber-optic communications devices, respectively.

DTIC

Acetylene; Amines; Anisotropy; Beam Steering; Birefringence; Broadband; Communication Equipment; Electro-Optics; Fiber Optics; High Voltages; Infrared Radiation

19980015743 University of Central Florida, Dept. of Physics, Orlando, FL USA

Event-Locked Time-Resolved Fourier Spectroscopy for NS Dynamic Processes *Final Report, 15 Jun. 1996 - 14 Jun. 1997*

Peale, Robert E., University of Central Florida, USA; Jun. 1997; 10p; In English

Contract(s)/Grant(s): F49620-96-I-0322; AF Proj. 2301

Report No.(s): AD-A329717; AFOSR-TR-97-0507; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

We realized that achieving 10 ns resolution would still require significant time interleaving and would be based on the rather complicated ECL semiconductor technology, which introduces additional risk. We decided instead to make more time resolution advances in several smaller steps, so that the robustness, functionality, and flexibility could be enhanced in systems we could easily test. The 4.5 GHz transient digitizer already contains mature high speed electronics and only requires a trigger signal with small jitter, which can readily be achieved with conventional CMOS technology. Time resolutions below 1 ns seem therefore possible.

DTIC

Analog to Digital Converters; Robustness (Mathematics); Semiconductors (Materials); Spectroscopy; Temporal Resolution

19980015918 Research Triangle Inst., Research Triangle Park, NC USA

Efficiency Optimization Control of AC Induction Motors: Initial Laboratory Results *Final Report, Jan. 1992 - Sep. 1994*

Turner, M. W., Research Triangle Inst., USA; McCormick, V. E., Research Triangle Inst., USA; Cleland, J. G., Research Triangle Inst., USA; Feb. 1996; 71p; In English

Report No.(s): PB96-153424; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

A fuzzy logic, energy optimizing controller has been developed to improve the efficiency of motor/drive combinations which operate at varying load and speed conditions. The energy optimizer is complemented by a sensorless speed controller which maintains motor shaft Revolutions Per Minute (RPM) to produce constant output power. Efficiency gains of from 1 to 20% are obtained from laboratory demonstration with commercial motors and drives. Motor shaft RPM is controlled to within 0.5%. The energy optimizing controller used for vector control adjustable speed drives is complemented by a torque pulsation control scheme to rapidly damp vibrations.

NTIS

Controllers; Optimization; Efficiency; Product Development; Alternating Current; Electric Motors; Air Pollution

19980016084 NERAC, Inc., Tolland, CT USA

Multilayer Ceramic Capacitors. (Latest Citations from Ceramic Abstracts Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864228; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the properties, processing, and testing of multilayer ceramic capacitors (MLCC). Included in the citations are electric, dielectric, and mechanical properties of MLCCs. Methods of testing used to evaluate MLCCs include acoustic emission, double-cantilever-beam, and nondestructive evaluation. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Capacitors; Ceramics

19980016142 Norwegian Defence Research Establishment, Kjeller, Norway

Detection of Moving Magnetic Dipoles by Three-Dimensional Matched Filter Techniques

Palmstroem, R. E., Norwegian Defence Research Establishment, Norway; Wang, G., Norwegian Defence Research Establishment, Norway; Jan. 23, 1996; 92p; In English

Report No.(s): PB96-173364; FFI/RAPPORT-96/00446; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

In this report the theoretical framework for the detection of a moving magnetic dipole by means of a vector (triaxial) magnetometer using matched filter techniques is developed. One application of interest is the detection of ship passages. It is assumed that the target is moving along a straight line with constant given speed and orientation of the magnetic moment. Signal to noise ratio is calculated for the additive gaussian noise, and formula for false alarm rate for a given detection threshold at the output

of a vector matched filter is given. The theory includes a whitening procedure for noise with 1/f characteristics. In order to make the work self contained detailed treatment of the theory is given.

NTIS

Matched Filters; Magnetic Dipoles; Signal Detection

19980016151 NERAC, Inc., Tolland, CT USA

Superconducting Cables: Long Distance Energy Transmission. (Latest Citations from the NTIS Bibliographic Database)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863881; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, development, and evaluation of superconducting cables and power transmission lines for long distance energy transmission. Topics include methods of cryogenic refrigeration and electrical insulation, fabrication and development of niobium alloy conductors, energy loss analysis, and dielectric design of superconducting power transmission systems. Government research reports on superconducting technology for electric power transmission and distribution are also reviewed.(Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Superconducting Power Transmission; Electric Power Transmission; Transmission Lines

19980016321 Fuji Electric Co. Ltd., Tokyo, Japan

Fuji Electric Journal, Volume 68

1995; 62p; In Japanese; Portions of this document are not fully legible

Report No.(s): PB96-129481; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Contents include the following: Fuji Electric's Semiconductor Devices; Power MOSFET for Power Factor Control Circuits; Power Semiconductor Devices for Uninterruptible Power Supply; Diodes for Switching Power Supply; Ceramic Surge Absorbers Z-TRAP; Integrated Circuits for Switching Power Supply Controllers; Control ICs for DC-DC Converters; High Efficiency DC-DC Converters; Quick Battery Charger Complying with Harmonic Current Regulations; Autofocus Module; On-a-chip Integrated Pressure Sensor; Fieldbus Interface Control LSI.

NTIS

Semiconductor Devices; Field Effect Transistors; Diodes; Ceramics

19980016376 National Inst. of Standards and Technology, Gaithersburg, MD USA

Electric Motor Efficiency Testing under the New Part 431 of Chapter II of Title 10, Code of Federal Regulations: Enforcement Testing

Stricklett, K. L., National Inst. of Standards and Technology, USA; Vangel, M., National Inst. of Standards and Technology, USA; Jan. 1997; 21p; In English

Report No.(s): PB97-137236; NIST/TN-1422; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This document provides commentary on the rules for efficiency testing of polyphase electric motors proposed by the new Part 431 of the Code of Federal Regulations (10 CFR Part 431) as published for public comment in the Federal Register. Section 2 discusses the criteria for compliance of a basic model with the mandated efficiencies; Section 3 discusses the objectives and general guidelines considered in developing the Sampling Plan for Enforcement Testing provided in the new Part 431; Section 4 discusses of the operating characteristics of the Sampling Plan for Enforcement Testing; Section 5 provides points of contact for further information, and Section 6 contains a list of references.

NTIS

Electric Motors; Regulations

19980016540 Fuji Electric Co. Ltd., Tokyo, Japan

Fuji Electric Review, Volume 41

1995; 33p; In English

Report No.(s): PB96-129549; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Contents include the following: Control ICs for DC-DC Converters; Integrated Circuits for a Switching Power Supply; Power MOSFETs for Power-Factor Improvement Circuits; Diodes for Switching Power Supplies; Power Semiconductor Devices for Inverters; and Power Semiconductor Devices for Traction Inverter Application.

NTIS

Integrated Circuits; Semiconductor Devices; Control Equipment

19980016541 Fuji Electric Co. Ltd., Tokyo, Japan

Fuji Electric Journal, Volume 68

1995; 56p; In Japanese; Portions of this document are not fully legible

Report No.(s): PB96-129507; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Contents include the following: Present Status and Prospect of Semiconductor Devices; Semiconductor Devices for Automobiles; Power Semiconductor Devices for Traction Inverter Application; Semiconductor Devices for Displays; Semiconductor Devices for Information Terminals; Power Semiconductor Devices for Inverters; Semiconductor Devices for Inverters of Household Electric Appliances.

NTIS

Semiconductor Devices; Inverters; Electric Power Supplies

19980016612 Princeton Resources, Inc., NJ USA

Proceedings of the InterNational Symposium on Integrated Ferroelectrics, Part 1

Taylor, G. W., Princeton Resources, Inc., USA; Kingon, A. I., Princeton Resources, Inc., USA; PazdeAraujo, C. A., Princeton Resources, Inc., USA; Scott, J. F., Princeton Resources, Inc., USA; Sigov, A. S., Princeton Resources, Inc., USA; 1995; 390p; In English; 7th, 20-22 Mar. 1995, Colorado Springs, CO, USA

Report No.(s): PB96-146915; Copyright Waived; Avail: CASI; A17, Hardcopy; A04, Microfiche

The seventh InterNational Symposium on Integrated Ferroelectrics was held again at the Antlers Doubletree Hotel in Colorado Springs, Colorado from March 19 to 22, 1995. Approximately 240 participants were registered, reflecting the ongoing interest in the topic. A total of 139 papers were accepted for oral or poster presentation. The program was organized according to the following format: Materials Processing; Device Processing and Integration; Applications and Devices; Characterization and Testing; Modelling and Theory; Special Session on Layered Perovskites. The special lunch address was given by Dr. H. Watanabe of NEC, who spoke about challenges facing advanced large scale integrated circuits.

NTIS

Ferroelectric Materials; Conferences; Ferroelectricity

19980016639 Michigan Univ., Radiation Lab., Ann Arbor, MI USA

Sub-Millimeter Waveguide for Monolithic Circuits Final Report, Sep. 1992 - Sep. 1995

Dib, Nihad I., Michigan Univ., USA; Katehi, Linda P., Michigan Univ., USA; Jul. 1997; 36p; In English

Contract(s)/Grant(s): F19628-92-K-0027; AF Proj. 2305

Report No.(s): AD-A329438; RL-TR-97-45; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Millimeter and sub-millimeter wave three-dimensional open dielectric structures are characterized using the Finite Difference Time Domain (FDTD) technique. The use of FDTD method allows for the accurate characterization of these components over a very wide frequency range. Three different sub-mm wave transitions to Layered Ridge Dielectric Waveguide (LRDW) are analyzed. These are found to be efficient over a wide sub-mm frequency band which makes them useful for a variety of applications. Theoretical results for a mm-wave image guide coupler show good agreement with experimental data. Sub-mm wave LRDW directional couplers are analyzed. A 3-db, 500 GHz coupler with negligible radiation loss is designed using an iterative procedure. This shows that the FDTD technique can be used not only as an analysis method, but also as a design tool which takes into account all high frequency parasitic effects. A matched termination for the LRDW is described and analyzed.

DTIC

Submillimeter Waves; Three Dimensional Models; Integrated Circuits

19980016702 NERAC, Inc., Tolland, CT USA

Multichip Modules. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-856109; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning multichip modules (MCMs) and systems. The design and fabrication of MCM structures, packages, and substrates are presented. References discuss MCM types, interconnections, thermal contacts, pin grip arrays, temperature monitoring, cooling systems, lids, and wafer scales. Applications in the manufacture of integrated circuits and semiconductor devices are included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Electronic Packaging; Modules; Chips (Electronics)

19980016741 Technische Univ., Delft, Netherlands

Single Electron Transport and Quantum Confinement in Semiconductor Nanostructures

vander Vaart, N., Technische Univ., Netherlands; Oct. 03, 1995; 127p; In English

Report No.(s): PB96-130844; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The thesis presents an experimental study on transport properties of semiconductor quantum dots. These submicron structures are defined in the two dimensional electron gas (2DEG) of GaAs / AlGaAs heterostructures by means of metallic gates, which are fabricated on top of the heterostructure. Applying negative voltages to the gates depletes the electron gas underneath them and forms an isolated island of electron gas in the 2DEG. This island, or dot, is weakly coupled to the leads by tunnel barriers. The interplay between quantum confinement and the single electron tunneling is studied in a small quantum dot containing less than 50 electrons. Tunneling between two quantum dots is investigated in two limits. First, the authors studied a double quantum dot, where each dot has an effectively continuous density of states. In the second experiment the authors used a smaller double dot to study quantum size effects. Transport through the double dot, containing only 25 and 50 electrons showed resonant tunneling through two discrete energy states.

NTIS

Semiconductor Devices; Transport Properties; Nanostructures (Devices); Electric Potential; Fabrication

19980016770 National Inst. of Standards and Technology, Boulder, CO USA

Dielectric and Magnetic Measurements from -50 C to 200 C and in the Frequency Band 50 MHz to 2 GHz

Baker-Jarvis, J., National Inst. of Standards and Technology, USA; Grosvenor, J. H., National Inst. of Standards and Technology, USA; Mar. 1996; 20p; In English

Report No.(s): PB96-191382; NISTIR-5045; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This is an overview of techniques for dielectric and magnetic measurements of low-loss through high-loss materials in the frequency range from 50 MHz to 2 GHz and over a temperature range of -50 C to 200 C. The authors conclude that a single fixture is not adequate to satisfy the measurement objectives. The necessary measurements can be met using a combination of reentrant cavity, coaxial line, and dielectric resonator fixtures. In order to minimize heat loss, the coaxial line fixture should be milled from stainless steel stock and then gold plated. The reentrant cavity and split post resonator fixtures should be fitted with high temperature coaxial cables and temperature control obtained from an environmental furnace.

NTIS

Dielectrics; Transmission Lines; Electrical Measurement; Temperature Dependence; Frequency Ranges; Magnetic Measurement; Coaxial Cables; Temperature Control

19980016785 National Inst. of Standards and Technology, Semiconductor Electronics Div., Gaithersburg, MD USA

Semiconductor Measurement Technology: Survey of Optical Characterization Methods for Materials, Processing, and Manufacturing in the Semiconductor Industry

Bullis, W. M., National Inst. of Standards and Technology, USA; Perkowitz, S., National Inst. of Standards and Technology, USA; Seiler, D. G., National Inst. of Standards and Technology, USA; Dec. 1995; 54p; In English

Report No.(s): PB96-154596; NIST/SP-400-98; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Contactless, nondestructive optical methods are used to characterize many critical properties of materials, processes, and devices in the semiconductor industry. to determine the extent of use and the relative importance of various optical methods in the industry, the Semiconductor Electronics Division of the National Institute of Standards and Technology conducted a survey of this field. The survey also sought to identify both advantages and limitations of these techniques as well as future requirements for and anticipated use of optical characterization methods within the semiconductor industry. Data from 42 firms were analyzed to show the impact of the methods, what they measure, their range and precision, and their cost. A significant finding of the study

is the need expressed by many industrial users for improved standards and test methods for optical characterization, especially in the area of film thickness and composition.

NTIS

Optical Measurement; Semiconductor Devices; Silicon

19980016828 Joint Inst. for Nuclear Research, Lab. of Nuclear Problems, Dubna, USSR

Amplitude-time distributions of the PMT afterpulses *Amplitudno-vremennye kharakteristiki posleimpul'sov fotoumnozhi-telej*

Morozov, V. A., Joint Inst. for Nuclear Research, USSR; Morozova, N. V., Joint Inst. for Nuclear Research, USSR; 1996; 16p; In Russian

Report No.(s): JINR-R-13-96-243; DE97-622541; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

Amplitude-time distributions of PMT afterpulses are investigated with an autocorrelation method in range from 20 ns to 1,4 micro-s. Photomultiplying tubes XP2020 Q, FEU-87, FEU-30 are examined. Afterpulses were due to ion feedback. The intensities of afterpulses on the PMT power supply voltage and the output amplitudes of main pulses were analyzed.

DOE

Pulse Amplitude; Autocorrelation; Time Dependence; Frequency Modulation Photomultipliers

19980016841 National Defence Research Establishment, Div. of Sensor Technology, Linköping, Sweden

Investigations of Microwave Breakdown in Transmit-Receive Switches and in Air *Topical Report Undersökning av Mik-rovågsoverslag i Saendar-Mottagarroer och i Luft*

Madsen, K., National Defence Research Establishment, Sweden; Apr. 1997; 101p; In English

Report No.(s): PB97-206833; FOA-R-97-00431-612-SE; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This work considers two technically important applications of microwave breakdown in gases. A detailed theoretical as well as experimental investigation is made of breakdown phenomena in microfichermicrowave transmit-recv (TR) switches. Using simple physical modeling, a number of theoretical predictions are obtained for the characteristic properties of the TR-switch and the predictions are shown to be in good agreement with experimental data for a number of different TR-switches. The characteristic properties of microwave breakdown in air has also been investigated, using a short pulse 37 GHz high power microwave (HPM) generator. The transmitted microwave field strength and the characteristic time for formation of self-induced breakdown plasma have been measured and shown to be in good agreement with previously published theoretical models. In particular, the experimental results confirm the theoretical prediction that the microwave electric field increases strongly with decreasing pulse length. A visual recording of the breakdown pattern in the focused microwave beam has also been made, giving a clear picture of the distribution of breakdown regions along the propagation path of the microwave.

NTIS

Microwaves; Switches; Gases; Transmitter Receivers; Microwave Transmission; Electric Generators

19980016875 NERAC, Inc., Tolland, CT USA

Charge Coupled Device Imaging. (Latest citations from the INSPEC Database)

Apr. 1996; In English

Report No.(s): PB96-868252; Copyright Waived; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Micro-fiche

The bibliography contains citations concerning visible and infrared imaging devices that use the charge coupled concept. Topics include applications, theoretical studies, and design considerations. Among the applications examined are image simulation, facsimile transmitters, optical character readers, television cameras, x-ray imaging, astronomical observations, and traffic monitoring equipment. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Charge Coupled Devices; Infrared Imagery

19980016876 Carnegie-Mellon Univ., Rail Systems Center, Pittsburgh, PA USA

Battery Energy Storage for Rail Transit Systems

Uher, R. A., Carnegie-Mellon Univ., USA; Apr. 1996; 179p; In English

Report No.(s): PB96-183637; FTA-PA-26-0008-96-2; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

A battery simulation model was developed to work in conjunction with the Rail Transit Energy Management Model (EMM) to estimate the performance of battery energy storage on rail transit systems. This model uses a battery which is connected directly

to the DC bus at a substation. No power conditioning equipment is involved, thus reducing the cost of a battery station substantially. Although these types of battery stations could be used for peak load shaving, voltage boost, and increasing energy receptivity on a system with regenerating trains, it was found that the last of these uses proved economically feasible. Because energy receptivity is increased, the peak load will also be shaved.

NTIS

Rails; Electric Batteries; Electric Potential; Energy Storage

19980016899 Army Research Lab., Adelphi, MD USA

Developing High-Efficiency Zn₂SiO₄:Mn Thin-Film Phosphors for Flat-Panel Cathodoluminescent Displays, Jan. - May 1997

Liu, Jiang, Army Research Lab., USA; Morton, David C., Army Research Lab., USA; Li, Y., Structured Materials Industries, Inc., USA; Forsythe, W., Structured Materials Industries, Inc., USA; Tompa, G. S., Structured Materials Industries, Inc., USA; Dec. 1997; 17p; In English

Contract(s)/Grant(s): DASG60-93-C-0141, \ F19628-96-

Report No.(s): AD-A333381; ARL-TR-1502; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Zn₂SiO₄:Mn thin films were produced and studied for their potential application as thin film phosphors for high-resolution flat-panel cathodoluminescent displays. Crystallized films with improved electrical conductivity were obtained after conventional and rapid thermal annealings in an N₂ environment at 850 to 1100 deg C for 0.25 to 60 min. A maximum cathodoluminescent efficiency of 1.3 lm/W was achieved under dc excitation at 1500 V. The luminescent emission from these thin films peaked around 525 nm. The decay time of these films was controlled in the range of 2 to 10 ms by variation of the deposition and annealing parameters. Because their fast response time overcomes the long decay limitation of the Zn₂SiO₄:Mn powder phosphor, these thin films will be suitable for practical display applications.

DTIC

Thin Films; Flat Panel Displays; Product Development; Cathodoluminescence; Scanning Electron Microscopy

34

FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling. For related information see also 02 Aerodynamics and 77 Thermodynamics and Statistical Physics.

19980012720 Army Engineer Waterways Experiment Station, Coastal and Hydraulics Lab., Vicksburg, MS USA

COSFLOW: A Finite Element Model Coupling One-Dimensional Canal, Two-Dimensional Overland, and Three-Dimensional Subsurface Flow Final Report

Yeh, Gour-Tsyh, Pennsylvania State Univ., USA; Cheng, Jin-Ru, Pennsylvania State Univ., USA; Li, Ming-Hsu, Pennsylvania State Univ., USA; Cheng, Hwai-Ping, Pennsylvania State Univ., USA; Lin, Hsin-Chi J., Army Engineer Waterways Experiment Station, USA; Sep. 1997; 200p; In English

Report No.(s): AD-A329997; WES/TR/CHL-97-20; No Copyright; Avail: CASI; A09, Hardcopy; A03, Microfiche

This report presents the user's manual of COSFLOW, which is a three-dimensional Finite Element Model coupling one-dimensional (1-D) Canal, two-dimensional (2-D) Overland, and three-dimensional (3-D) Subsurface Flow. The 1-D channel flow is described by water budget under the assumption that equilibrium within each channel reach is achieved instantaneously. The 2-D overland flow is modeled with a diffusive wave approach. Retention ponds included in the overland flow are simulated with a water budget approximation. In this version, solute transport is not considered in the coupled system; but for the future consideration, the subsurface solute transport module is included in the computer code. In this report, however, emphasis is given to the coupling of flow between 3-D subsurface, 1-D channel, and 2-D overland retention pond systems. The details associated with solute transport in the subsurface, such as density-dependent transport and salt intrusion, can be found in the user's manual of 3DFEMFAT. In the channel module, the volumetric flow rates from the channel to the subsurface nodes, or vice versa, are computed within each channel time-step, and are accumulated within each subsurface time-step (one subsurface time-step usually includes many channel time-steps). The pumping from the channel can be directed to another channel reach, a subsurface node, or a retention pond, which is designed to store excess water in a canal.

DTIC

Finite Element Method; Channel Flow; Flow Velocity; Three Dimensional Flow; Computer Programs; Mathematical Models; Three Dimensional Models

19980012760 NERAC, Inc., Tolland, CT USA

Velocity Measurement: Laser Applications. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English; Page count unavailable.

Report No.(s): PB96-856851; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the use of lasers in the velocity measurement of fluids and solid objects. Specific devices and application methods, and noise reduction techniques in laser Doppler velocimeter systems are discussed. Applications are described, including the measurement of air speed, blood flow, the rotation and vibration of mechanical components, and particulate matter in fluids.

NTIS

Bibliographies; Velocity Measurement; Noise Reduction; Technologies

19980013160 Rocky Research Corp., Boulder City, NV USA

Heat Transfer Additives for Absorption Cooling System Fluids Phase 3 Annual Report, Nov. 1994 - Oct. 1995

Chandler, T., Rocky Research Corp., USA; Saunders, M., Rocky Research Corp., USA; Nov. 1995; 37p; In English

Report No.(s): PB96-182985; GRI-96/0061; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The rates of absorption of water vapor by $\text{CaBr}_2\text{-H}_2\text{O}$ and $\text{ZnBr}_2\text{-H}_2\text{O}$ fluids, and the effect of chemical additives is measured experimentally and analyzed in the context of a homogeneous phase chemical catalysis mechanism presented previously. Literature concerning the chemical structure of the salt solutions is reviewed. Alcohols and other chemical classes are seen to be active with both fluids by experiments in a vertical-tube falling-film test sorber. With $\text{CaBr}_2\text{-H}_2\text{O}$ solutions, soluble alcohols were found to be active, corroborating prior work with other fluids and demonstrating that surfactant properties are not involved. Structural differences of zinc halide solutions are considered, and their consequences are compared to other fluids. By applying the chemical mechanism to absorption data for the alternate fluids, it is seen to be general.

NTIS

Natural Gas; Heat Transfer; Additives; Cooling Systems; Absorption Cooling

19980013176 NASA Lewis Research Center, Cleveland, OH USA

1996 Coolant Flow Management Workshop

Hippensteele, Steven A., Editor, NASA Lewis Research Center, USA; Aug. 1997; 353p; In English; 1996 Coolant Flow Management Workshop, 12-13 Dec. 1996, Cleveland, OH, USA; Sponsored by Ohio Aerospace Inst., USA; Also announced as 19980013177 through 19980013194

Contract(s)/Grant(s): RTOP 523-26-13

Report No.(s): NASA-CP-10195; E-10761; NAS 1.55:10195; No Copyright; Avail: CASI; A16, Hardcopy; A03, Microfiche

The following compilation of documents includes a list of the 66 attendees, a copy of the viewgraphs presented, and a summary of the discussions held after each session at the 1996 Coolant Flow Management Workshop held at the Ohio Aerospace Institute, adjacent to the NASA Lewis Research Center, Cleveland, Ohio on December 12-13, 1996. The workshop was organized by H. Joseph Gladden and Steven A. Hippensteele of NASA Lewis Research Center. Participants in this workshop included Coolant Flow Management team members from NASA Lewis, their support service contractors, the turbine engine companies, and the universities. The participants were involved with research projects, contracts and grants relating to: (1) details of turbine internal passages, (2) computational film cooling capabilities, and (3) the effects of heat transfer on both sides. The purpose of the workshop was to assemble the team members, along with others who work in gas turbine cooling research, to discuss needed research and recommend approaches that can be incorporated into the Center's Coolant Flow Management program. The workshop was divided into three sessions: (1) Internal Coolant Passage Presentations, (2) Film Cooling Presentations, and (3) Coolant Flow Integration and Optimization. Following each session there was a group discussion period.

Author

Conferences; Numerical Analysis; Heat Transfer; Experimentation; Computational Grids

19980013177 NASA Lewis Research Center, Cleveland, OH USA

On the Use of Structured Multi-Block Grids for Internal Coolant Flow Calculations

Rigby, David L., NYMA, Inc., USA; Ameri, Ali A., AYT Corp., USA; Steinthorsson, Erlendur, NASA Lewis Research Center, USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 33-45; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

Reasonable heat transfer prediction can be achieved in complex geometries. Multi-block grid allows efficient placement of grid points, and efficient use of computer resources. Wilcox k-(omega) turbulence model predicts heat transfer well, and has good numerical behavior.

Author

Multiblock Grids; K-Omega Turbulence Model; Navier-Stokes Equation; Computational Fluid Dynamics; Internal Flow; Turbulent Heat Transfer; Grid Generation (Mathematics); Reynolds Averaging

19980013178 Carnegie-Mellon Univ., Dept. of Mechanical Engineering, Pittsburgh, PA USA

Numerical Simulation of Turbine Blade Cooling

Shih, Tom I.-P., Carnegie-Mellon Univ., USA; Stephens, Mark A., Carnegie-Mellon Univ., USA; Lin, Yu-Liang, Carnegie-Mellon Univ., USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 47-63; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

Objectives of the paper are: (1) Develop, adapt, and validate CFD codes for studying internal and film cooling of turbine blades, and (2) Apply CFD codes to study flow physics associated with internal and film cooling. Develop design strategies for more effective cooling.

Author

Turbine Blades; Computational Fluid Dynamics; K-Omega Turbulence Model; Navier-Stokes Equation; Computerized Simulation; Film Cooling; Ducted Flow; Multiblock Grids; Turbulent Heat Transfer

19980013179 Scientific Research Associates, Inc., Glastonbury, CT USA

Flow in Serpentine Coolant Passage with Trip Strips

Tse, David, Scientific Research Associates, Inc., USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 65-82; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

In advanced gas turbine engines increased temperatures, stage pressure ratios and rotor speeds are used to increase thrust/weight ratio and to reduce specific fuel consumption. Efficient internal cooling is essential to maintain structural integrity. Rotation gives rise to Coriolis and buoyancy forces which can significantly alter the local heat transfer in the coolant passage. A better understanding of interaction of Coriolis, buoyancy and trip induced secondary flows and the capability to predict heat transfer response to these effects is necessary for achieving efficient cooling. The complex coupling of Coriolis and buoyancy forces has led many investigators to study the heat transfer characteristics of rotating cooling passages. There were significant increases in heat transfer at the turns and there were considerable differences between inward and outward flow in the straight passage. Velocity fields played an important role in convective heat transfer. In practice, cooling passages contain trips, which create secondary flow to augment heat transfer. This presentation deals with flow in a serpentine passage with ribbed walls.

Author

Fluid Flow; Coolants; Gas Turbine Engines; Temperature Dependence; Pressure Ratio; Rotation; Velocity Distribution; Serpentine

19980013180 United Technologies Research Center, East Hartford, CT USA

Assessment of Heat Transfer Coefficients in Turns of Turbine Blade Coolant Passages

Wagner, Joel, United Technologies Research Center, USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 83-96; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The objective of the paper is to experimentally measure, assess, and analyze the heat transfer within the internal cooling configuration of a serpentine coolant passage for comparison with Computational Fluid Dynamics (CFD) and numerical heat transfer prediction codes.

Derived from text

Experimentation; Coolants; Data Acquisition; Computational Fluid Dynamics; Heat Transfer; Mathematical Models; Turbine Blades

19980013181 NASA Lewis Research Center, Cleveland, OH USA

Experimental Multipass Heat Transfer with Trips and Bleed

Thurman, Douglas, NASA Lewis Research Center, USA; Poinsatte, Philip, NASA Lewis Research Center, USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 97-102; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Testing is currently in progress to acquire simple geometry surface heat transfer data for internal channels with trips and bleed holes which can be used in the development and validation of models. The transient liquid crystal technique is used on a simple

multipass model with rectangular channels and normal ribs. Normal bleed holes are located on the floor of the model in the first channel. Each hole is attached to a flow meter, allowing various bleed flow rates to simulate external pressures on the blade.

Author

Experimentation; Heat Transfer; Pressure Reduction; Internal Flow

19980013182 Texas A&M Univ., Dept. of Mechanical Engineering, College Station, TX USA

Heat Transfer Local Distributions in Rotating Multipass Channels with Bleed

Lau, Sai C., Texas A&M Univ., USA; Park, C. W., Texas A&M Univ., USA; Kukreja, R. T., Texas A&M Univ., USA; Kandis, M., Texas A&M Univ., USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 103-114; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The main objective is to make available detailed local experimental data with rotating multipass channel models: to enable better understanding of the effects of rotation, sharp turns, channel geometry, and rib turbulators on the heat transfer distributions in cooling serpentine passages in modern gas turbine blades; and to help improve the design of these cooling passages.

Author

Heat Transfer; Flow Distribution; Pressure Reduction; Turbine Engines; Evaporative Cooling

19980013183 Minnesota Univ., Mechanical Engineering Dept., Minneapolis, MN USA

Film Cooling Lateral Diffusion and Hole Entry Effects

Simon, Terry, Minnesota Univ., USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 125-142; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The objectives of the study are to support film cooling modeling and design by describing the effects on film cooling performance of anisotropic eddy transport, and the geometry of the plenum from which the film cooling flow enters the holes. In the process, we documented the effects of freestream turbulence, hole L/D and blowing ratio. This will lead to more accurate computation with design models, aid in the assessment of film cooling data in the literature, and assist in the selection of supply plenum geometric features. It also lends a glimpse into the physics of this complex flow.

Author

Film Cooling; Diffusion; Turbulence Effects; Turbulent Diffusion; Mathematical Models

19980013184 Louisiana State Univ., Mechanical Engineering Dept., Baton Rouge, LA USA

Numerical Simulation of a Film Cooling Jet in Crossflow

Acharya, Sumanta, Louisiana State Univ., USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 143-156; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The hydrodynamics of a film-cooling jet in crossflow is rather complex. Near field is dominated by coherent vortical structures. These include: Jet-shear layer vortices; Counter-rotating vortex pair; Horse-shoe vortices and Wake vortices. The need exists to accurately predict these dynamical structures. In jet and mixing-layer flows, the near-field dynamical structures control the mixing and entrainment behavior. The dynamics of these structures can not be predicted by time-averaged predictive procedures.

Author

Numerical Analysis; Film Cooling; Jet Flow; Cross Flow; Computational Fluid Dynamics; Turbulence Models

19980013185 AYT Corp., Cleveland, OH USA

Heat Transfer in Film-Cooled Turbine Blades

Garg, Vijay, AYT Corp., USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 157-180; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The objectives of the study include: (1) Developing tools and models to accurately predict hot gas side heat transfer to a film-cooled turbine blade; (2) Minimizing the injected mass flow for a given cooling efficiency; and (3) Decreasing aerodynamic losses induced by the jet-secondary flow interaction.

Author

Heat Transfer; Film Cooling; Turbine Blades; Navier-Stokes Equation; Baldwin-Lomax Turbulence Model; Jet Flow

19980013186 NASA Lewis Research Center, Cleveland, OH USA

The Effect of Tabs on a Jet in a Cross-Flow

Zaman, Khairul, NASA Lewis Research Center, USA; VanZante, Judith Foss, NASA Lewis Research Center, USA; 1996 Coolant

Flow Management Workshop; Aug. 1997, pp. 181-190; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

A tab placed on the leeward side of the nozzle was expected to increase jet penetration into the cross-flow. An experiment at UTRC showed insignificant effect. The primary objective of the present study was to confirm and explain the ineffectiveness. The overall approach of the study was to conduct experiments in a low-speed wind tunnel and to conduct hot-wire measurements for mean velocity and streamwise vorticity fields.

Author

Jet Flow; Cross Flow; Vorticity; Tabs (Control Surfaces); Wind Tunnel Tests

19980013187 NASA Lewis Research Center, Cleveland, OH USA

Film-Cooling Heat-Transfer Measurements Using Liquid Crystals

Hippensteele, Steven A., NASA Lewis Research Center, USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 191-198; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The following topics are discussed: (1) The Transient Liquid-Crystal Heat-Transfer Technique; (2) 2-D Film-Cooling Heat-Transfer on an AlliedSignal Vane; and (3) Effects of Tab Vortex Generators on Surface Heat Transfer. Downstream of a Jet in Crossflow.

Author

Film Cooling; Heat Transfer; Heat Measurement; Technologies; Liquid Crystals

19980013188 Allison Engine Co., Indianapolis, IN USA

Turbine Vane Heat Transfer, Film Cooling and Turbulence Experiments

Ames, Forrest E., Allison Engine Co., USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 199-224; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

Several years ago a test was run at Allison on an advanced film cooled vane design. The tests indicated we were overpredicting film cooling protection on the pressure side. Results suggested we were underpredicting surface heat transfer downstream from the pressure surface film cooling. The current study was undertaken to improve our understanding of the film cooled pressure surfaces with high inlet turbulence. The study's objectives were: to examine influence of high inlet turbulence on vane film cooling, and document local heat transfer rate and BL with jet injection.

Author

Heat Transfer; Turbines; Film Cooling; Turbulence Effects; Guide Vanes

19980013189 NASA Lewis Research Center, Cleveland, OH USA

Investigation of Rotor Wake Effects on Film Cooling

Heidmann, James D., NASA Lewis Research Center, USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 225-237; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The following are conclusions and recommendations from the study. Primary wake effect is linear reduction in η with St. Secondary wake effect is skewing of suction/pressure side cooling. Steady computations match experimental Nu, but overpredict η . Unsteady computations elucidate wake/film interaction. Model may be used to estimate wake passing effect. Need boundary layer and full stage experiments. Need resolved film hole and full stage unsteady computations. Need validated turbulence models for film cooling.

Author

Turbulent Wakes; Rotor Aerodynamics; Film Cooling

19980013190 Texas A&M Univ., Dept. of Mechanical Engineering, College Station, TX USA

Unsteady High Turbulence Effect on Turbine Blade Film Cooling Heat Transfer Performance Using a Transient Liquid Crystal Technique

Du, H., Texas A&M Univ., USA; Ekkad, S. V., Texas A&M Univ., USA; Han, J. C., Texas A&M Univ., USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 239-259; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The objectives of the project are to study detailed distributions of heat transfer coefficients and film effectiveness for a gas turbine blade, including film cooling hole regions, under the effects of upstream flow conditions including: (1) free stream turbu-

lence; (2) unsteady wakes (3) unsteady wakes with trailing edge coolant ejections, and the effects of film cooling injections with air and CO₂ as coolants including: (1) blowing ratios; (2) coolant-to-mainstream density ratios; and (3) advanced film hole shapes.

Author

Unsteady Flow; Turbulence Effects; Turbine Blades; Film Cooling; Heat Transfer; Liquid Crystals; Turbulent Wakes; Turbulent Flow

19980013191 Allied-Signal Aerospace Co., Phoenix, AZ USA

CFD/Experiments to Optimize Film-Cooling Hole Shape Design Tools

Kim, Yong, Allied-Signal Aerospace Co., USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 275-283; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The objectives and approach for the study are as follows: Reduce DOC by 3 to 5% by increased TRIT of 100 to 200 F without excessive increase in cooling flow. Produce Benchmark 3-D unsteady film cooling heat transfer measurements. Validate 3-D Computational Fluid Dynamics (CFD) models to benchmark data. Increase film cooling effectiveness with advanced hole shape. Initiate MultiDisciplinary Optimization (MDO) applicable to airfoil cooling. Complete Benchmark Measurements. Complete Film Cooling 3-D CFD Model Validation. Complete Initial MDO of Turbine Airfoils.

Author

Computational Fluid Dynamics; Film Cooling; Hole Geometry (Mechanics); Design Analysis; Tools; Three Dimensional Models

19980013192 General Electric Co., Aircraft Engines, Cincinnati, OH USA

Turbine Airfoil Film Cooling: Design Integration

Bergholz, Robert, General Electric Co., USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 285-297; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

Transient test facility built to determine both heat transfer and film effectiveness in linear airfoil cascades. Steady-state operation provides film effectiveness. Base line test conducted with cylinders in cross flow. Stagnation point heat transfer agrees with established correlations. Linear airfoil cascade show: (1) mach number distributions agree with inviscid code predictions; (2) airfoil heat transfer coefficients measured with plugged film holes follow boundary layer code predictions; and (3) film injection increases heat transfer levels both on pressure and suction sides.

Author

Turbines; Airfoils; Film Cooling; Design Analysis; Hole Geometry (Mechanics); Computational Fluid Dynamics

19980013193 NASA Lewis Research Center, Cleveland, OH USA

An Initial Multi-Domain Modeling of an Actively Cooled Structure

Steinhorsson, Erlendur, NASA Lewis Research Center, USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 299-310; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

A methodology for the simulation of turbine cooling flows is being developed. The methodology seeks to combine numerical techniques that optimize both accuracy and computational efficiency. Key components of the methodology include the use of multiblock grid systems for modeling complex geometries, and multigrid convergence acceleration for enhancing computational efficiency in highly resolved fluid flow simulations. The use of the methodology has been demonstrated in several turbo machinery flow and heat transfer studies. Ongoing and future work involves implementing additional turbulence models, improving computational efficiency, adding AMR.

Author

Turbulence Models; Cooling; Heat Transfer; Multiblock Grids; Finite Volume Method; Computerized Simulation; Turbomachinery

19980013194 Pennsylvania State Univ., Dept. of Aerospace Engineering, University Park, PA USA

Aero-Thermo-Structural Optimization of Cooled Turbine Blades

Dulikravich, George, Pennsylvania State Univ., USA; 1996 Coolant Flow Management Workshop; Aug. 1997, pp. 311-333; In English; Also announced as 19980013176; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The objectives of the study are to develop a design system for constrained optimization of 3-D cooled turbine blades and to provide industry with a modular design optimization tool that will take into account interaction of the hot gas flow field, heat transfer in the blade material and the internal coolant flow field, and stress/deformation field in the blade.

Author

Optimization; Thermodynamic Efficiency; Structural Analysis; Turbine Blades; Coolants; Design Analysis; Three Dimensional Models

19980014084 Southwest Research Inst., San Antonio, TX USA

Metering Research Facility Program Orifice Meter Installation Effects: Two-Inch Bare Orifice Meter Tube Tests *Topical Report, July 1996*

Morrow, T. B., Southwest Research Inst., USA; Jul. 1996; 101p; In English

Report No.(s): PB97-104954; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Results are presented of the 2-inch (50 millimeter) diameter baseline (reference) and 'typical field installation' orifice meter calibrations. The baseline calibration orifice coefficient tests were run with a long straight upstream meter tube length and a tube bundle straightening vane placed in the inlet to remove swirl. The baseline data were used to qualify the flow facility and to calculate the percentage deviation from baseline value for the orifice meter installation effects tests.

NTIS

Flowmeters; Natural Gas; Calibrating; Orifices; Millimeter Waves; Bundles

19980014517 Institut National Polytechnique, Grenoble, France

Eleventh Symposium on Turbulent Shear Flows, Volume 1, Sessions 1-10, Poster Session 1

Sep. 10, 1997; 445p; In English; 11th; Symposium on Turbulent Shear Flows, 8-10 Sep. 1997, Grenoble, France, USA

Report No.(s): AD-A332421; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

These proceedings contain the papers presented at the Eleventh Symposium on Turbulent Shear Flows held at the Institut National Polytechnique and the Universite' Joseph Fourier of Grenoble, France, September 8-10, 1997. The purpose of these biennial interNational symposia is to provide a forum for presentation and discussion of new developments in the field of turbulence, especially as related to shear flows of importance in engineering and geophysics.

DTIC

Conferences; Turbulent Flow; Shear Flow; Turbulence; Combustion

19980015098 Purdue Univ., School of Mechanical Engineering, West Lafayette, IN USA

Momentum Transport in Turbulent Boundary Layers With Multiple Pressure Gradients *Final Report, 1 Nov. 1992 - 31 Aug. 1996*

Schwarz, Andreas C., Purdue Univ., USA; Plesniak, Michael W., Purdue Univ., USA; Murthy, S. N., Purdue Univ., USA; May 08, 1997; 129p; In English

Contract(s)/Grant(s): F49620-93-I-0003

Report No.(s): AD-A331266; AFOSR-97-0565TR; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

An experimental study was performed to examine the effects of multiple extra rates of strain imposed on a turbulent boundary layer. This study is motivated by the necessity to develop predictive models of momentum and heat transport to facilitate design of turbomachinery, especially in the leading edge region of inlet guide vanes. The strain rates considered in the simplified experimental configuration resulted from wall curvature and axial pressure gradient. The effects of these strains on the transport of turbulence were studied for various combinations of strong and moderate curvature coupled with favorable and adverse pressure gradients. Extensive laser Doppler velocimetry measurements were made in a low-speed water channel, with an ability to resolve the near-wall region. Mean velocities, Reynolds stresses and production terms were computed from the measurements. Time-resolved velocity records were used to infer turbulent burst period and ejection duration using the uv2 quadrant technique, with grouping. The results revealed that the strain rates interacted nonlinearly and that the rate of application was at least as important as the magnitude of the applied strains. The friction velocity provided appropriate scaling for Reynolds stresses in the inner layer, but outside of the logarithmic layer large changes caused by the extra strains were not compensated by this scale. An analytical framework based on the orientation of the principle axes of the strain rate and Reynolds stress tensors was evaluated.

DTIC

Pressure Gradients; Turbulent Boundary Layer; Momentum Transfer; Experimentation; Models; Heat Transfer

19980015122 Southwest Research Inst., San Antonio, TX USA

Metering Research Facility Program: Performance Tests of 12-Inch Multipath Ultrasonic Flow Meters *Topical Report, Oct. 1994-Mar. 1996*

Grimley, T. A., Southwest Research Inst., USA; Aug. 1996; 52p; In English

Report No.(s): PB97-104863; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Commercially available Daniel and Instromet 12-inch multipath ultrasonic flow meters have been tested at the Gas Research Institute (GRI) Metering Research Facility (MRF) in baseline and disturbed flow installations. This report presents test assess baseline accuracy and repeatability over a range of flowrates and pressures, and meter performance for two installation configurations. Comparisons are also made between the speed of sound as measured by the test meters and values calculated based on gas

composition. These data demonstrate that the test meters are capable of accuracies well within a 1 percent tolerance and have repeatability of better than 0.25 percent when the flowrate is above about 5 percent of capacity.

NTIS

Flowmeters; Flow Velocity; Natural Gas; Gas Composition; Acoustic Velocity

19980015135 Stanford Univ., Dept. of Mechanical Engineering, Stanford, CA USA

Optimal and Robust Control Transition and Turbulence in Plane Channel Flow *Final Report, 1 Jan. 1993 - 30 Sep. 1996*

Moin, Parviz, Stanford Univ., USA; Bewley, Thomas, Stanford Univ., USA; Dec. 19, 1996; 68p; In English

Contract(s)/Grant(s): F49620-93-I-0078

Report No.(s): AD-A329660; AFOSR-TR-97-0461; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Efficient feedback control algorithms based on optimal and robust control theories have been formulated and tested in direct numerical simulations of turbulent channel flow. The optimization technique used is based solely on the equations governing the fluid flow and variations of a mathematical statement of the control objective, without the heuristic procedures normally used to determine effective flow control algorithms. The control algorithms tested are shown to be extremely effective, and a host of new ideas for the determination of simple, implementable, effective control rules for turbulent flows have been proposed and are currently still under investigation. The problem of transition control via optimal and robust techniques has also been studied to draw parallels between the linear and nonlinear theories on problems of significant interest in fluid mechanics. Results on this problem have also been quite good and clearly demonstrate how the control theories are related. With this insight, an important extension of the concepts of robust control theory to nonlinear problems has been made.

DTIC

Fluid Mechanics; Heuristic Methods; Optimal Control; Optimization; Turbulence; Turbulent Flow; Fluid Flow

19980015331 Japan Atomic Energy Research Inst., Tokyo, Japan

An object-oriented programming paradigm for parallelization of computational fluid dynamics

Ohta, Takashi, Japan Atomic Energy Research Inst., Japan; Mar. 1997; 25p; In Japanese

Report No.(s): JAERI-Data/Code-97-012; DE97-750687; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We propose an object-oriented programming paradigm for parallelization of scientific computing programs, and show that the approach can be a very useful strategy. Generally, parallelization of scientific programs tends to be complicated and unportable due to the specific requirements of each parallel computer or compiler. In this paper, we show that the object-oriented programming design, which separates the parallel processing parts from the solver of the applications, can achieve the large improvement in the maintenance of the codes, as well as the high portability. We design the program for the two-dimensional Euler equations according to the paradigm, and evaluate the parallel performance on IBM SP2.

DOE

Computational Fluid Dynamics; Object-Oriented Programming; Fluid Flow; Parallel Processing (Computers)

19980015355 National Aerospace Lab., Amsterdam, Netherlands

Demonstration of an Automated CFD System for Three-Dimensional Flow Simulations

vanderBurg, J. W., National Aerospace Lab., Netherlands; Maseland, J. E. J., National Aerospace Lab., Netherlands; Hagmeijer, R., National Aerospace Lab., Netherlands; deCock, K. M. J., National Aerospace Lab., Netherlands; 1997; 28p; In English

Report No.(s): PB97-178867; NLR-TP-95120-U; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this paper the capabilities of an automated Computational Fluid Dynamics (CFD) system which is currently available at NLR are demonstrated. Transonic flow around the AS28G wing/body configuration and hypersonic flow through a generic three-dimensional mixed-compression airbreathing inlet are simulated. An assessment of the level of automation of the current CFD-system is made. The problem-turnaround time lies within the order of a week for both applications.

NTIS

Computational Fluid Dynamics; Hypersonic Flow; Three Dimensional Flow; Transonic Flow; Computer Aided Design; Intake Systems; Computerized Simulation; Body-Wing Configurations; Air Breathing Engines

19980016027 Institute for Computer Applications in Science and Engineering, Hampton, VA USA

The Variational Method for Aerodynamic Optimization Using the Navier-Stokes Equations *Final Report*

Soemarwoto, Bambang, Institute for Computer Applications in Science and Engineering, USA; Dec. 1997; 30p; In English

Contract(s)/Grant(s): NAS1-19480; RTOP 505-90-52-01

Report No.(s): NASA/CR-97-206277; NAS 1.26:206277; ICASE-97-71; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report describes the formulation of an aerodynamic shape design methodology using a compressible viscous flow model based on the Reynolds-Averaged Navier-Stokes equations. The aerodynamic shape is described by a set of geometrical design variables. The design problem is formulated as an optimization problem stated in terms of an aerodynamic objective functional which has to be minimized. The design scheme employs a gradient-based optimization algorithm in order to obtain the optimum values of the design variables. The gradient of the aerodynamic functional with respect to the design variables is computed by means of the variational method, which requires the solution of an adjoint problem. The formulation of the adjoint problem is described which leads to a set of adjoint equations and boundary conditions. Using the flow variables and the adjoint variables, an expression for the gradient has been constructed. Computational results are presented for an inverse problem of an airfoil. It will be shown that, starting from an initial geometry of the NACA 0012 airfoil, the target pressure distribution and geometry of a best-fit of the RAE 2822 airfoil in a transonic flow condition has been reconstructed successfully.

Author

Optimal Control; Reynolds Averaging; Navier-Stokes Equation; Computational Fluid Dynamics; Compressible Flow; Viscous Flow; Two Dimensional Flow

19980016148 NERAC, Inc., Tolland, CT USA

Supercritical Fluids. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864673; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning apparatus and methods for supercritical fluid (SF) extraction and separation of industrial materials. Patents cover SF materials, chromatography, and delivery. SF applications are examined, including use in coatings as diluents, cholesterol extraction, polymer recycling, ceramic production, combustible liquid enhancement, and compound extraction from plant materials. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Supercritical Fluids

19980016544 NYMA, Inc., Brook Park, OH USA

LSPRAY: A Lagrangian Spray Solver User's Manual Final Report

Raju, M. S., NYMA, Inc., USA; Nov. 1997; 68p; In English

Contract(s)/Grant(s): NAS3-27186; RTOP 523-26-33

Report No.(s): NASA/CR-97-206240; NAS 1.26:206240; E-10974; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

LSPRAY is a Lagrangian spray solver developed for application with parallel computing and unstructured gas flow solvers. It is designed to be massively parallel and could easily be coupled with any existing gas-phase flow and/or Monte Carlo Probability Density Function (PDF) solvers. The solver accommodates the use of an unstructured mesh with mixed elements of either triangular, quadrilateral, and/or tetrahedral type for the gas flow grid representation. It is specifically used for fuel sprays within gas turbine combustors, but it has many other uses. The manual provides the user with the coding required to couple the spray code to any given flow code and a basic understanding of the LSPRAY code structure and the models involved in the spray formulation. The source code of LSPRAY will be available with the National Combustion Code (NCC) as a complete package.

Author

Combustion; Computational Fluid Dynamics; Parallel Processing (Computers); Unstructured Grids (Mathematics); Gas Flow; Fuel Sprays; Gas Turbines; Two Phase Flow; User Manuals (Computer Programs)

19980016562 Southwest Research Inst., San Antonio, TX USA

Metering Research Facility Program: Orifice Meter Installation Effects Bibliography Topical Report, Jan. 1995 - May 1996

Morrow, T. B., Southwest Research Inst., USA; LaNasa, P. J., Southwest Research Inst., USA; Jul. 1996; 36p; In English

Report No.(s): PB97-104947; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This bibliography was developed to assist the ongoing activities of the American Petroleum Institute (API) Manual of Petroleum Measurement Standards Chapter 14.3, Part 2 working group for revision of the standard on orifice metering of natural gas and other hydrocarbon fluids. The chapter is concerned with specification and installation requirements for the design and opera-

tion of metering facilities using orifice meters. The Orifice Meter Specifications section of the bibliography lists materials on the specification of orifice plates, flanges, and fittings; sensing taps; meter tubes; and flow conditioners.

NTIS

Bibliographies; Crude Oil; Flowmeters; Natural Gas; Orifices

19980016692 Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette, France

Shock Profiles for the Partially Asymmetric Simple Exclusion Process

Derrida, B., Ecole Normale Supérieure, France; Lebowitz, J. L., Institut des Hautes Etudes Scientifiques, France; Speer, E. R., Institut des Hautes Etudes Scientifiques, France; Feb. 1997; 36p; In English; Figures in this document may not be legible in microfiche

Report No.(s): PB97-156244; IHES/P/97/15; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The asymmetric simple exclusion process (ASEP) on a one-dimensional lattice is a system of particles which jump at rates p and $1 - p$ (here p greater than $1/2$) to adjacent empty sites on their right and left respectively. The system is described on suitable macroscopic spatial and temporal scales by the inviscid Burgers' equation; the latter has shock solutions with a discontinuous jump from left density p to right density $p(+)$, $p(-) < p(+)$, which travel with velocity $(2p - 1)(1 - (p(+)-p(-)))$. In the microscopic system we may track the shock position by introducing a second class particle, which is attracted to and travels with the shock. In this paper we obtain the time invariant measure for this shock solution in the ASEP, as seen from such a particle.

NTIS

Exclusion; Inviscid Flow; Burger Equation; Shock Wave Propagation; Particles

19980016700 NERAC, Inc., Tolland, CT USA

Flow Visualization. (Latest Citations from the NTIS Bibliographic Database)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-856067; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning flow visualization techniques used in fluid dynamic and aerodynamic studies. The use of smoke, water vapor, dyes, and particles in general for flow visualization is examined. Citations pertaining to holographic theory and recording techniques are covered in a separate bibliography. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Flow Visualization; Fluid Flow

19980016712 NASA Lewis Research Center, Cleveland, OH USA

Seals/Secondary Flows Workshop 1996, Volume 2

Hendricks, Robert C., Editor, NASA Lewis Research Center, USA; Oct. 1997; 500p; In English; Seals/Secondary Flows Workshop 1996, 23-24 Oct. 1997, Cleveland, OH, USA; Also announced as 19980016713 through 19980016731; Original contains color illustrations

Contract(s)/Grant(s): RTOP 233-1B-1B

Report No.(s): NASA-CP-10198/Vol-2; NAS 1.55:10198/Vol-2; E-10936/Vol-2; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

This workshop has four categories. (1) In the opening sessions we are attempting to provide an overview of engine technology, applications and perceived needs from both a global and the seal/secondary flow perspective. (2) In the second sessions we are attempting to present more details of seal and secondary flow components requirements, designs, and solutions. (3) In the third sessions we examine some of the tools available to assess the flows, loads and life for turbomachines. (4) In the fourth session we examine some of the new technologies available to turbomachine designers. Synergistic coupling of these categories brings another dimension of reality to efforts both at NASA LeRC and via contractors to expand U.S. aerospace technology and market-share. In general, company sensitive materials are probably not included even though the workshop participation was - and this publication is - limited to U.S. Citizens and OEM'S.

Author

Secondary Flow; Turbomachinery; Seals (Stoppers); Conferences; Gas Turbine Engines; Aircraft Engines

19980016718 CFD Research Corp., Huntsville, AL USA

Simulation of Gas Turbine Secondary and Main Path Flows and Ingestion

Athavale, M. M., CFD Research Corp., USA; Ho, Y. H., CFD Research Corp., USA; Przekwas, A. J., CFD Research Corp., USA;

Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 589-619; In English; Also announced as 19980016712; Original contains color illustrations; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

The paper begins with an overview of the objectives, followed by a brief discussion of the numerical methodology of SCI-SEAL code used in the simulations; the current version uses multi-block structured grids. I will then present results for two cavity-mainpath flow cases: UTRC Large Scale Rig, built to simulate the SSME high-pressure fuel turbopump turbine section, and the turbine section of the Allison T-56 engine. In summary it can be concluded that: Flow fields are very complex in multi-cavity, multimainpath environments; CFD tools can be used to a great advantage for obtaining detailed, reasonable predictions; Interaction between the mainpath and secondary flow systems is important and can become of critical importance for optimized coolant management; 2-D axisymmetric runs provide very detailed numbers and a good start, but need to be extended much further. Time accurate interaction simulations (3-D), at rim seals need to consider blade passing effects, etc. Thermal information in solid parts can be used with a structures code for predictions of deformation, and influence on flow, e.g., at rim and labyrinth seals.

Derived from text

Cavity Flow; Secondary Flow; Computerized Simulation; Computational Fluid Dynamics; Flow Characteristics; Mathematical Models; Flow Measurement; Flow Visualization

19980016731 NASA Lewis Research Center, Cleveland, OH USA

Seals/Secondary Flows

Hendricks, Robert C., NASA Lewis Research Center, USA; Steinetz, B. M., NASA Lewis Research Center, USA; Athavale, M. M., CFD Research Corp., USA; Przekwas, A. J., CFD Research Corp., USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 865-955; In English; Also announced as 19980016712; Original contains color illustrations; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

The paper provides a developmental history of various phases of our interactive seals/secondary/powerstream flow fields with emphasis on the numerical computations instigated by the experimental testing in the YT-700 engine program. It summarizes the solver, model and grid along with the results and impact on the industry. Selected references provide more in-depth resources and the page numbers relate to the terse textual materials. When changes are made in an engine, the interactive effects between seals, secondary flows and powerstream flows are often considered minor or neglected. But what really happens when for instance you make a significant change as the CDP seal or perhaps even a minor change in the interstage turbine cavity seal? The results can be very enlightening and range from very positive reductions in SFC to catastrophic failure with losses of aircraft and lives of pilots.

Derived from text

Secondary Flow; Gas Turbines; Labyrinth Seals; Brush Seals; Computational Fluid Dynamics; Turbulence Models; Computerized Simulation; Flow Distribution; Computational Grids

19980016778 National Aerospace Lab., Aerodynamics Div., Amsterdam, Netherlands

Development of a Fully Automated CFD System for Three-Dimensional Flow Simulations Based on Hybrid Prismatic-Tetrahedral Grids

vanderBurg, J. W., National Aerospace Lab., Netherlands; Maseland, J. E. J., National Aerospace Lab., Netherlands; Oskam, B., National Aerospace Lab., Netherlands; Jan. 17, 1996; 25p; In English

Report No.(s): PB97-212484; NLR-TP-96036-U; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this paper an assessment of CFD methods based on the underlying grid type is made. It is safe to say that emerging CFD methods based on hybrid body-fitted grids of tetrahedral and prismatic cells using unstructured data storage schemes have the potential to satisfy the basic requirements of problem-turnaround-time and accuracy for complex geometries. The CFD system described in this paper is based on the hybrid prismatic-tetrahedral grid approach. In an analysis it is shown that the cells in the prismatic layer have to satisfy a central symmetry property in order to obtain a second-order accurate approximation of the viscous terms in the Reynolds-averaged Navier-Stokes equations. Prismatic grid generation is demonstrated for the ONERA M6 wing-alone configuration and the AS28G wing/body configuration.

NTIS

Aerodynamic Configurations; Body-Wing Configurations; Grid Generation (Mathematics); Navier-Stokes Equation; Reynolds Averaging; Reynolds Equation; Three Dimensional Flow

19980016788 Rutherford Appleton Lab., Advanced Interactive Systems Div., Chilton, UK

Progress Report of the EPSRC Computational Fluid Dynamics Community Club, Apr. 1992 - Mar. 1995

Greenough, C., Rutherford Appleton Lab., UK; Thomas, D., Rutherford Appleton Lab., UK; Aug. 1995; 27p; In English

Report No.(s): PB96-133459; RAL-TR-95-038; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Contents include the following: Introduction; A Historical Background; Community Club Objectives; A Review of Activities (Club Meetings, Common Software Library, Data Sets and Test Problems Availability of Software and Data, Access to Commercial Software); Introductory School on CFD; Workshop on Quality Assurance for FORTRAN 77 Programs; EPSRC/IMEchE Expert Meeting; The CFD Community Club Membership and Steering Group; Relationship with other Complementary Organisations; The Future Programme; Further Information.

NTIS

Computational Fluid Dynamics; Conferences; Data Bases; Computer Programs; Applications Programs (Computers)

35

INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography. For aerial photography see 43 Earth Resources and Remote Sensing. For related information see also 06 Aircraft Instrumentation, and 19 Space Instrumentation.

19980012506 NERAC, Inc., Tolland, CT USA

Photographic Films. (Latest citations from the US Patent Bibliographic File with Exemplary Claims)

Jan. 1996; In English; Page count unavailable.

Report No.(s): PB96-858816; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning photographic film technology. Included are references to camera film emulsion chemistry, sensitivity, and methods of application. References to canister-based loading and design of delivery and use are discussed.

NTIS

Bibliographies; Photographic Film; Technologies

19980014570 National Lab. for High Energy Physics, Tsukuba, Japan

Radiation detectors and their uses

Miyajima, Mitsuhiro, Editor, National Lab. for High Energy Physics, Japan; Sasaki, Shinichi, Editor, National Lab. for High Energy Physics, Japan; Iguchi, Tetsuo, Editor, Tokyo Univ., Japan; Nakazawa, Masaharu, Editor, Tokyo Univ., Japan; Jul. 1996; 273p; In English; 10th; Proceedings of the Workshop on Radiation Detector and Its Application, 23-25 Jan. 1996, Tsukuba, Japan Report No.(s): KEK-PROC-96-4; CONF-9601112; DE97-729553; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

This issue is the collection of the paper presented at the title meeting. The 32 of the presented papers are indexed individually. (J.P.N.)

DOE

Conferences; Radiation Detectors; Amplifiers; Signal Processing

19980015112 Department of the Navy, Washington, DC USA

Mechanical Crush Gauge and Method of Using Same to Measure Free-Field Energy Flux Density

Sanford, Matthew J., Inventor, Department of the Navy, USA; Sep. 30, 1997; 16p; In English

Patent Info.: US-Patent-Appl-SN-941932

Report No.(s): AD-D018624; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

A mechanical crush gauge has a housing defining a fixed diameter hole that holds a sample of deformable material and an indenter having a flat end and a spherically-shaped end opposite the flat end. The indenter has its flat end flush with the surface of the housing and its spherically-shaped end in tangential contact with the sample. The indenter is made from a material having a yield strength orders of magnitude greater than that of the sample. Energy absorbed by the flat end is converted into kinetic energy that forces the spherically-shaped end against the sample to form a spherical dent therein indicative of energy flux density. In use, the diameter of the spherical dent is measured and converted to an energy value indicative of energy absorbed by the sample per unit area of the flat end of the indenter. The energy value is then calibrated by a correction factor that accounts for an acoustic impedance mismatch between the mechanical crush gauge and the medium of energy transmission in order to arrive at the free-field energy in the medium.

DTIC

Patent Applications; Kinetic Energy; Crushing; Gauge Invariance; Measuring Instruments

19980015178 SQM Technology, Inc., La Jolla, CA USA

Development of a Magnetic Telescope for Evaluating Integrity of Buried Steel Gas Piping from the Surface *Annual Report, Nov. 1992 - Dec. 1993*

Podney, W., SQM Technology, Inc., USA; Sep. 1995; 54p; In English

Report No.(s): PB96-155387; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The object is to develop an instrument that uses highly sensitive, superconductive, magnetic sensors to evaluate integrity of buried gas piping from the surface, through a two meter overburden.

NTIS

Pipelines; Nondestructive Tests; Squid (Detectors); Gas Pipes

19980015210 National Inst. of Standards and Technology, Gaithersburg, MD USA

Specifications and Tolerances for Reference Standards and Field Standards Weights and Measures. 6. Specifications and Tolerances for Thermometers

Harris, G. L., National Inst. of Standards and Technology, USA; Oct. 1997; 26p; In English

Report No.(s): PB98-113715; NIST/HB-105-6; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

These specifications and tolerances are recommended as minimum requirements for temperature measuring devices, hereafter referred to as thermometers, used by State and local weights and measures programs for thermometer testing associated with device and quantity control enforcement activities.

NTIS

Thermometers; Standards; Specifications; Temperature Measurement; Tolerances (Mechanics)

19980015620 National Inst. of Standards and Technology, Electromagnetic Fields Div., Boulder, CO USA

Noise-Temperature Measurement System for the WR-28 Band

Randa, J., National Inst. of Standards and Technology, USA; Terrell, L. A., National Inst. of Standards and Technology, USA; Aug. 1997; 44p; In English

Report No.(s): PB98-110265; NIST/TN-1395; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The NIST Noise Project has recently completed the construction and testing of a system for the measurement of the noise temperatures of sources with WR-28 output flanges. The system covers the entire frequency range of the WR-28 band, 26.5 GHz to 40.0 GHz. This paper reports the design, system checks, and operational procedures of the new WR-28 system. The next subsection reviews the theory underlying noise-temperature measurements with a total-power radiometer and derives the radiometer equation. Section 2 gives a detailed description of the measurement system. In Section 3, we review the steps used to make a noise-temperature measurement system. In Section 4 presents the checkout procedures, including a review of the different tests which ensure that the system is functioning properly. The uncertainty analysis for the WR-28 system is presented in Section 5, and the paper closes with a brief summary in Section 6.

NTIS

Microwave Radiometers; Thermal Noise; Noise Temperature; Temperature Measurement; Noise Measurement

19980016026 California Univ., Berkeley, CA USA

Evaluation of Relative Sensitivity of SAW and Flexural Plate Wave Devices for Atmospheric Sensing *Final Report*

White, Richard M., California Univ., USA; Black, Justin, California Univ., USA; Chen, Bryan, California Univ., USA; [1998]; 10p; In English

Contract(s)/Grant(s): NCC2-5185

Report No.(s): NASA/CR-97-206768; NAS 1.26:206768; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The objective of this project is to evaluate the suitability of the ultrasonic flexural plate wave (FPW) device as the detector in a gas chromatograph (GC). of particular interest is the detection of nitrous oxide (N₂O). From experimental results we conclude analyte detection is achieved through two mechanisms: changes in gas density, and mass loading of the device membrane due to the sorption of gas molecules. Reducing the dead volume of the FPW chamber increased the FPW response. A comparison of the FPW response to that of the surface acoustic wave (SAW) detector provided with the GC (made by MSI, Microsensor Technologies, Inc.), shows that for unseparated N₂O in N₂, the FPW exhibits a sensitivity that is at least 550 times greater than that of the SAW device. A Porapak Q column was found to separate N₂O from its carrier gas, N₂ or He. With the Porapak Q column, a coated FPW detected 1 ppm N₂O in N₂ or He, with a response magnitude of 7 Hz. A coated SAW exhibited a response of 25 Hz to pure N₂O. The minimal detectable N₂O concentrations of the sensors were not evaluated.

Author

Gas Chromatography; Gas Detectors; Nitrous Oxides; Sensitivity; Atmospheric Composition

19980016611 NERAC, Inc., Tolland, CT USA

Piezoelectric Transducers (Latest Citations from the NTIS Bibliographic Database)

Dec. 1995; In English; Page count unavailable

Report No.(s): PB96-855861; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the technology and applications of piezoelectric transducers. Applications include microwave equipment, integrated optics, holography, acoustic surface wave devices, detectors, and memory devices. Fabrication of accelerometers, physics associated with piezoelectric phenomena, device calibration, and the applications in ultrasonics are also described. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Piezoelectric Transducers; Bibliographies

19980016617 NERAC, Inc., Tolland, CT USA

X-ray Lithography (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Oct. 1995; In English; Page count unavailable

Report No.(s): PB96-851050; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning x-ray lithography. Topics cover high-intensity pulse, self-anodizing collimator, high resolution E-beam, microstructure formation, diamond membranes, illumination systems, silicon carbide membranes, mask ring assembly, palladium anode fabrication, and masks optical alignment. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; X Rays; Lithography

19980016651 NERAC, Inc., Tolland, CT USA

Sensors and Detectors Based on Superconducting Devices (Latest Citations from the Ei Compendex*Plus Database)

May 1996; In English; Page count unavailable

Report No.(s): PB96-869532; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning gradiometers, magnetometers, and infrared detectors which use superconductors to improve sensitivity. Applications include biomagnetic measurements for medical studies, gravity wave experiments, geomagnetism and ocean bottom magnetic exploration, galvanometers and voltmeters, and bolometers and radiometers. Some articles refer to design considerations for cooling systems for the sensors and detectors, and fabrication techniques for SQUIDS (superconducting quantum interference devices).

NTIS

Bibliographies; Biomagnetism; Bolometers; Cooling Systems; Gravity Waves; Infrared Detectors; Magnetometers; Ocean Bottom; Radiometers; Squid (Detectors)

36

LASERS AND MASERS

Includes parametric amplifiers. For related information see also 76 Solid-State Physics.

19980012551 NERAC, Inc., Tolland, CT USA

Lasers: Lithography and Microlithography. (Latest citations from the Ei Compendex*Plus database)

Jan. 1996; In English

Report No.(s): PB96-859236; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the use of lasers in lithographic and microlithographic processes that are employed in the production of integrated circuits and printing-plates. Topics include deep ultraviolet lithography, applications of excimer lasers, and the lasers' effects on substrates used in lithographic processes. Laser printers, and photoresists used in litho-

graphic processes, are examined in separate bibliographies. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Laser Applications; Lithography; Integrated Circuits; Bibliographies

19980012553 NERAC, Inc., Tolland, CT USA

Neodymium YAG Lasers. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English

Report No.(s): PB96-859160; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning design, fabrication and testing of neodymium doped yttrium aluminum garnet (YAG) lasers. Citations cover quantum efficiency, stabilization, mode locking, frequency conversion, and modulation. Some laser applications are included, especially if the citation covers design confirmation or comparison with other types of lasers. Among these applications are optical communications, range finding, tracking, cutting, drilling, and welding. Safety hazards and radiation damage are also referenced. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Neodymium Lasers; YAG Lasers; Bibliographies

19980015151 National Defence Research Establishment, Avdelningen foer Sensorteknik, Linkoeeping, Sweden

Laser Radar 1996: Coherent and Direct Detection Laser Radars at 1.55 microns Final Report Slutrapport Laserradar 1996: Koherent och Direktdetekterande Laser Radar vid 1.55 mu m

Karlsson, C., National Defence Research Establishment, Sweden; Letalick, D., National Defence Research Establishment, Sweden; May 1997; 26p; In English

Report No.(s): PB97-209696; FOA-R-97-00480-SE; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The report describes the activities at FOA under the FMV commission Laser radar. The overall aim with these studies is eye-safe, small, robust, and whispering (coherent system) laser radar systems for many military applications, e.g. for ranging. A new robust coherent laser radar based on a semiconductor-laser has been designed and build. The experimental results about frequency modulation (FM) show that it is possible to compensate for the dependence of the FM-response and the relative phase on the modulation frequency. This allows for FM without signal losses. A direct detection laser radar based on a pulsed semiconductor MOPA plus a fiber amplifier has been theoretically evaluated.

NTIS

Coherent Radar; Military Technology; Optical Radar; Phase Modulation; Semiconductor Lasers; Semiconductors (Materials)

19980015402 Department of the Navy, Washington, DC USA

Narrow Band Laser Speckle Suppression

Moon, John A., Inventor, Department of the Navy, USA; Busse, Lynda E., Inventor, Department of the Navy, USA; Aggarwal, Ishwar D., Inventor, Department of the Navy, USA; Apr. 29, 1997; 17p; In English

Patent Info.: US-Patent-Appl-SN-848623

Report No.(s): AD-D018507; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

A method and apparatus for reducing points of zero intensity, i.e. speckle pattern, emerging from a multimode fiber. The apparatus comprises a beam deflector for rotating an input beam in a conical shape around a launch lens for projecting the beam into the fiber. The rotation of the beam further incorporates the use of two tilting mirrors being 90 deg out of phase to ensure a conical rotation. The conical rotation of the beam deflector ensures that the lens aberrations, which are rotationally symmetric, do not play a factor in beam alignment into the fiber aperture.

DTIC

Laser Beams; Narrowband; Radar Beams; Speckle Patterns

19980015803 Georgia Inst. of Tech., School of Physics, Atlanta, GA USA

Nonlinear Dynamics of Coupled Laser Systems Annual Report, 1 Oct. 1996 - 30 Sep. 1997

Roy, Rajarshi, Georgia Inst. of Tech., USA; Oct. 17, 1997; 133p; In English

Contract(s)/Grant(s): N00014-96-I-0045

Report No.(s): AD-A330680; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

We have investigated the stability properties of two and three element laser arrays that are nearest neighbor coupled. A novel form of generalized synchronization has been discovered, where the outer elements of the three laser linear array are synchronized

identically, but the middle one is not synchronized with the outer ones. Experiments on fiber ring lasers have led to a model that employs delay equations coupled to a differential equation to describe the fast (nanosecond) dynamics of the polarized light output from these lasers. Four wave mixing of light beams at detuned frequencies has been studied both experimentally and theoretically and a unique set of measurements has been analyzed. Phase fluctuations of the light play an important role in the propagation of the sidebands through the fiber. The first experiments on optical communication with chaotic fiber lasers have been performed.

DTIC

Optical Communication; Polarized Light; Ring Lasers; Sidebands; Synchronism; Fiber Lasers

19980016146 National Research Lab. of Metrology, Sakura, Japan

Bulletin of NRLM. Asymmetrical Lamb Dip in a High-Gain Xe Laser, Volume 44

Asami, S., National Research Lab. of Metrology, Japan; 1995; 50p; In English

Report No.(s): PB96-127501; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The Lamb dip appears at the center of the atomic transition in the output power versus frequency characteristic in a single-mode gas laser, due to the nonlinear response of the polarization of a laser medium to the optical field. Experiments have been performed for the purpose of examining the output tuning characteristics of a single-mode 3.5 micrometer Xe laser. Deep and pronounced asymmetrical Lamb dips were observed for the first time by the author and co-workers. The output characteristics of a high-gain laser have been studied theoretically in order to analyze the asymmetrical Lamb dip. The asymmetry and depth of the dip, the average power of the peaks around the dip, and the frequency shift of the center of the tuning curve from that of the dip were measured over wide ranges of xenon pressure and discharge current.

NTIS

Gas Lasers; Laser Outputs; Electron Transitions

19980016375 National Inst. of Standards and Technology, Precision Engineering Div., Gaithersburg, MD USA

Laser Trackers: Traceability, Uncertainty, and Standardization. A Report to the CMSC

Caskey, G. W., National Inst. of Standards and Technology, USA; Fronczek, C. J., National Inst. of Standards and Technology, USA; Phillips, S. D., National Inst. of Standards and Technology, USA; Sep. 1997; 16p; In English

Report No.(s): PB98-104136; NISTIR-6061; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

During the CMSC conference of 1996, undoubtedly one of the hottest topics was how to achieve traceability for the laser tracker. At that time, the authors expressed some ideas on pursuing traceability through measurement uncertainty analysis, and as a follow up, agreed to form and support an American National Standards working group that would focus on this issue. This paper reviews the concepts of traceability and measurement uncertainty from NIST's perspective, and explains how these topics relate to the effort of developing a standard for laser trackers. An update on this standardization effort, a preview of the standard (including projected timetable), and what it means to users of this technology are also discussed.

NTIS

Lasers; Standardization

19980016897 Department of the Navy, Washington, DC USA

Amplification by Means of Dysprosium Doped Low Phonon Energy Glass Waveguides

Sanghera, Jasbinder, Inventor, Department of the Navy, USA; Shaw, Brandon, Inventor, Department of the Navy, USA; Cole, Brian, Inventor, Department of the Navy, USA; Harbison, Barry, Inventor, Department of the Navy, USA; Aggarwal, Ishwar, Inventor, Department of the Navy, USA; Aug. 29, 1997; 27p; In English

Patent Info.: US-Patent-Appl-SN-920877

Report No.(s): AD-D018634; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Disclosed herein is an amplification method, an optical glass amplifier, a laser based on the amplifier and an amplification optical communication system, all based on a limited length of a single-mode glass fiber made from glass having phonon energy of less than about 350 /cm and doped with dysprosium. The glass includes 0.1-30 mol% X, 0-40 mol% arsenic, 0.01-20 mol% gallium, 0.01-20 mol% Y, and 0.001-2 weight% dysprosium, wherein X is selected from the group consisting of germanium and mixtures of germanium and up to 50% of sulfur; and wherein Y is selected from the group consisting of selenium, indium and mixtures thereof. The system includes a coupler, a silica-based signal fiber carrying the optical signal that is to be amplified in communication with said coupling means, a pump light source in communication with the coupler, an amplifier in communication with the coupler at one end and another silica-based fiber joined to the amplifier at its other end. The method includes the steps of introducing the optical signal to be amplified into the coupler, introducing a pump optical signal into the coupling means, com-

binning the optical signal and the pump optical signal, introducing the combined optical signal into the amplifier and amplifying the optical signal by exciting the electrons in dysprosium so they emit at about 1.3 micron.

DTIC

Amplification; Doped Crystals; Dysprosium; Optical Materials; Optical Waveguides; Signal Processing; Fiber Optics; Laser Pumping; Light Amplifiers; Glass Lasers

37

MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

19980012541 NERAC, Inc., Tolland, CT USA

Tribology. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English

Report No.(s): PB96-859988; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning frictional and tribological behavior of such materials as thermoplastic and thermosetting plastics, ferrous and non-ferrous metals, and ceramics. The citations include effects by environmental changes, extreme wear conditions, and corrosion. Theoretical and practical studies in adhesion, friction, wear, and lubrication are presented. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Tribology; Bibliographies; Friction Factor

19980014531 NERAC, Inc., Tolland, CT USA

Electric Vehicles (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863329; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning design techniques of electric vehicles for road and rail transportation. Topics include drive and control systems for electric vehicle operation; and battery recharge, replacement, and monitoring methods and systems. The use of solar energy, wind power, and manual devices to charge batteries is considered. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Electric Motor Vehicles

19980015227 NERAC, Inc., Tolland, CT USA

Seals and Gaskets. (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864541; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the different types of seals and gaskets used to contain gases and liquids. Topics examine materials used, design aspects, configurations, methods for testing seals and gaskets, and the characterization of physical properties. Applications for gas turbines, water pumps, shaft seals, and spacecraft are reviewed.

NTIS

Seals (Stoppers); Sealers; Gaskets; Mechanical Properties; Design Analysis

19980015444 Northwestern Univ., Basic Industry Research Lab., Evanston, IL USA

Simulation of Electrosag Weld Defects: An Intermediate Report on Acoustic Emission Monitoring of Electrosag Welding

Prine, D., Northwestern Univ., USA; Oleksy, J. E., Northwestern Univ., USA; Malin, V., Northwestern Univ., USA; Feb. 16, 1996; 47p; In English

Contract(s)/Grant(s): DTFH-61-93-C-00104

Report No.(s): PB96-172655; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This intermediate report describes efforts to adapt Acoustic Emission (AE) monitoring technology to the in-process NonDestructive Evaluation (NDE) of ElectroSlag Welding (ESE). Methods were developed to introduce controlled artificial flaws in

ESW welds. AE monitoring equipment was assembled and techniques were developed to address the specific problems associated with AE monitoring of ESW. A total of seven welds were monitored in BIRL's welding laboratory. These welds had solidification cracks and Lack of Fusion (LOF) flaws both artificially induced and naturally formed. The recorded AE data were analyzed and the results were correlated with radiography. Preliminary accept-reject criteria were formulated.

NTIS

Electroslag Welding; Simulation; Defects; Emission; Acoustic Emission; Welding; Monitors

19980015544 NERAC, Inc., Tolland, CT USA

Lubrication and Wear Characteristics of Power Plant Rotating Machinery. (Latest Citations from Fluidex)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864863; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the lubrication and wear of rotating machinery parts. Topics include the effects of lubricants on bearings and the resulting friction effects on fuel consumption. The use of hard surfacing for wear resistance is considered. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Wear; Lubrication; Machinery

19980015647 General Electric Co., Advanced Engineering Programs Dept., Cincinnati, OH USA

Thin Dense Chrome Bearing Insertion Program Final Report, 1 Mar. 1992 - 1 Dec. 1996

Rhoads, Mark, General Electric Co., USA; Shucktis, Bernie, General Electric Co., USA; Johnson, Michael, General Electric Co., USA; Mar. 1997; 162p; In English

Contract(s)/Grant(s): F33615-92-C-2208; AF Proj. 3048

Report No.(s): AD-A330677; R97AEB141; WL-TR-97-2053; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This report includes the results of program efforts to develop and introduce a modular Thin Dense Chrome (TDC) plating process for aircraft engine mainshaft bearings. program objectives included development of a Thin Dense Chrome material/process specification and completing a thorough evaluation of all potential risks associated with introducing TDC coated Bearings into field engine applications. A comprehensive series of subscale and full scale tests were completed to evaluate the capabilities of TDC coated bearings at various inservice operating conditions. TDC coated bearings demonstrated improved corrosion and contamination resistance. TDC coated bearings also demonstrated acceptable performance during thermal cycle, oil-off, and induced defect conditions. However, the TDC coating performance did not meet the required objectives in the areas of rolling contact fatigue life, skid damage resistance, engine assembly damage tolerance, and engine operational endurance. Based on the results of this program, it was concluded that TDC coated bearings provided too great of a risk for insertion into the mainshaft bearing positions of military aircraft engines.

DTIC

Aircraft Engines; Corrosion Resistance; Fatigue Life; Full Scale Tests; Specifications; Tolerances (Mechanics)

19980016633 Texas Univ., Center for Transportation Research, Austin, TX USA

Texas Mobile Load Simulator Test Plan Interim Report

Hugo, F., Texas Univ., USA; Feb. 1996; 43p; In English

Report No.(s): PB96-191671; CTR-7-1978-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The report presents the first phase of a test plan for the use of the Texas Mobile Load Simulator (TXMLS). It was developed through an iterative process of consultation between TXDOT's Pavement Division and its researchers. The scope of this phase was limited to tests conducted in Victoria, Texas (Yoakum District). The guidelines for the selection of test sites and for testing operations at field locations that were developed under Project 1978 formed the basis of this Test Plan. The tasks and responsibilities of the research team from the respective universities have been incorporated in the report, together with the anticipated outputs from Phase 1. A research management structure was developed to ensure the necessary integration of these activities. This structure was augmented by the development of a testing and measurement protocol.

NTIS

Texas; Pavements; Simulators; Traffic

19980016693 Texas Univ., Center for Transportation Research, Austin, TX USA

Executive Summary Report on the Production of the Prototype Texas Mobile Load Simulator Final Report

Hugo, F., Texas Univ., USA; Mar. 1996; 31p; In English

Report No.(s): PB96-191663; CTR-7-1978-2F; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The report summarizes the 5-year development of the prototype Texas Mobile Load Simulator (TXMLS). As described in this executive summary, the project went through various phases, from conceptual design and manufacture, to commissioning and acceptance testing. The acceptance testing stretched over a period of one year. During this time, the MLS was upgraded and the methodology for using the machine developed. This effort provided the basis for the development of guidelines for operating the machine, as well as for the selection of test sites and for testing operations at field locations.

NTIS

Texas; Simulators; Dynamic Loads; Pavements; Nondestructive Tests; Traffic

19980016704 NERAC, Inc., Tolland, CT USA

Underwater Welding (Latest Citations from Oceanic Abstracts)

May 1996; In English; Page count unavailable

Report No.(s): PB96-869706; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the technology, research innovations, and equipment of underwater offshore welding. Welding of offshore drilling platforms and submerged pipelines is reviewed. Particular emphasis is placed on the development of explosive welding techniques for pipeline construction and repair, hyperbaric welding, and inert gas shielded welding. Computer applications to underwater welding are also examined.

NTIS

Arc Welding; Bibliographies; Computer Techniques; Explosive Welding; Maintenance; Offshore Platforms

19980016713 Pratt and Whitney Aircraft, West Palm Beach, FL USA

Brush Seal Technology Transition

Moore, Ken, Pratt and Whitney Aircraft, USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 465-475; In English; Also announced as 19980016712; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

The paper will touch on three basic areas. It will look at the barriers to brush seal technology transition. There are two types of barriers to transitioning brush seal technology, or any type of seal, into engines. The first type of barrier are those that have to do with the seal itself, cost, performance, wear, temperature capability, and so on. The second type of barrier are those that are not related to the seal but can preclude the incorporation of advanced seals because the flow level in a given cavity can not be reduced due to windage heat generation or gaspath ingestion. Secondly, an update will be provided on tuft wear testing that is being done at NASA Lewis. Lastly, the paper will touch on the status of transitioning brush seals into two engines, the F100-PW-229 and the F119-PW-100.

Derived from text

Brush Seals; Thermal Resistance; Wear Resistance; Gas Turbine Engines; Wear Tests; Heat Generation

19980016715 CFD Research Corp., Huntsville, AL USA

SCISEAL/TURBO: Numerical Coupling Method

Przekwas, Andrzej, CFD Research Corp., USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 501-538; In English; Also announced as 19980016712; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

The paper includes a discussion of the SCISEAL-U code (where U stands for Unstructured Grids), the TURBO code, unstructured adaptive meshing of complex turbomachinery geometries, an overview of the coupling procedure with associate numerical issues and the overall solution algorithm.

CASI

Turbomachinery; Unstructured Grids (Mathematics); Computational Fluid Dynamics; Turbulence Models; Numerical Flow Visualization; Flow Equations

19980016719 NASA Lewis Research Center, Cleveland, OH USA

The Impact of Seal Leakage Flow on the Performance of Multi-Stage Axial Flow Compressors

Adamczyk, John J., NASA Lewis Research Center, USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 621-630; In English; Also announced as 19980016712; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

To enhance the performance of multi-stage axial flow compressors beyond today's machines, it is becoming increasingly clear that the impact of under-platform seal leakage flow on the primary passage flow stream must be understood at a more fundamental level than exists today. Furthermore, analytical or semi-empirical models must be developed to account for the effect of under-platform leakage in CFD simulation codes so that these leakages are accounted for in numerical simulations. Finally, based on the results obtained from research studies, information must be drawn as to how to manage these leakage flows so as to minimize their impact on performance and, if possible, enhance performance.

Author

Leakage; Turbocompressors; Seals (Stoppers); Secondary Flow; Compressibility Effects; Axial Flow

19980016720 General Electric Co., Cincinnati, OH USA

Labyrinth Seal Thermomechanical Effects/Guidelines for Successful Operation

Kulesa, Joe, General Electric Co., USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 633-648; In English; Also announced as 19980016712; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

The current production preferred seal design is the labyrinth seal. General Electric Co. has a lot of experience with these types of seals so that is what the paper will concentrate on. There are two things in general that the paper deals with. The first is some thermal mechanical affects and how that affects the seal rub depth which affects temperatures, radial deflections and flows. and the other is general guidelines for successful operation of these labyrinth seals.

Derived from text

Labyrinth Seals; Thermomechanical Treatment; Standards

19980016722 Southwest Research Inst., San Antonio, TX USA

Damage Mechanisms Involving Seals and Secondary Flows: The Potential for Beneficial Application of Probabilistic Methods

Smalley, Anthony J., Southwest Research Inst., USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 673-698; In English; Also announced as 19980016712; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

Damage mechanisms and ways we might beneficially apply probabilistic methods are presented. Modeling methods, measurements and criteria are all subject to uncertainty. Probabilistic methods give us a way of managing uncertainty. They provide a new framework for engineering analysis and recommendations. They support and enhance economic decision analysis and they are currently underutilized. Damage mechanisms included are: seal rubs, diffuser stall in centrifugal compressors, turbine blade failure due to forced vibration, compressor blade failure due to material imperfections, and consequential damage from tip rubs.

CASI

Defects; Turbine Blades; Secondary Flow; Probability Theory; Damage Assessment; Seals (Stoppers)

19980016723 Memry Technologies, Inc., Brookfield, CT USA

Gas Turbine Compressor Blade Tip Control Using Shape Memory Alloy Rings

Schetky, L. MacDonald, Memry Technologies, Inc., USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 699-717; In English; Also announced as 19980016712; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

Shape memory alloy rings which are being developed to provide a seal to reduce leakage in a T55 axial compressor are discussed. When a shape memory alloy in its low temperature, martensitic, condition is deformed a significant amount, the deformation is retained until the alloy is heated. Thus, a shape memory alloy which is cooled to a temperature where it is 100% martensite is deformed, but then, when heated to the temperature where it transforms to the elevated temperature austenitic phase region it completely recovers that deformation. This property makes the alloy very attractive for use in compressor blade tip control.

CASI

Gas Turbines; Shape Memory Alloys; Seals (Stoppers); Elastic Deformation; Phase Transformations; Smart Structures; O Ring Seals

19980016724 NASA Lewis Research Center, Cleveland, OH USA

Alternative Seal Condition Monitoring Technologies

Madzar, George, NASA Lewis Research Center, USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 719-730; In English; Also announced as 19980016712; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

Alternative instrumentation and methods to the traditional temperature/pressure based seal condition monitoring techniques used in rotating type propulsion systems are presented. These methods include determination of seal condition by direct measurement of gas leakage, shaft speed/torque/power/resonance, and seal erosion. These techniques are extremely powerful since they not only provide information on seal condition, but also a host of other engine related health issues, thus minimizing the required instrumentation while maximizing the available information regarding seal/engine condition. A prime consideration for seals is leakage. Utilizing a "global" leak detection scheme enables measurement of leakage from seals as well as other engine components. Such a system could identify and locate leaking species, and eliminate sensor redundancy. Numerous techniques are schematically described, including semiconductor chemical sensors and optical measurement techniques. Selection of the appropriate technique is dependent on the particular application and/or installation. The determination of speed, torque, power and resonance of a rotating shaft enables condition, control, and performance monitoring. A non contact fiber optic sensor that can be utilized for these measurements is described. Torque measurement can provide an assessment of seal and bearing condition; resonance measurements may enable isolation of the specific component. Speed measurement enables control, and the overall performance/efficiency may be inferred from these measurements. The measurement of seal erosion can be accomplished by spectroscopic analysis of the engines' exhaust plume. This technique, originally pioneered for detection of rocket engine degradation, operates by determining the identities of the (eroded) specie that pass through an engine and out the exhaust. It is a real time system that enables early warning of impending failure, diagnosis of component degradation, inspection/maintenance planning, and failure analysis. Its capabilities include detection of wear/erosion, and identification of eroded species/alloy/component. It is independent of engine cycle/propellants, is a non intrusive/non contact measurement, and is flight compatible. The techniques and technologies described in this presentation were not originally developed for seal condition monitoring. However, if the view that seal condition monitoring is a subset of engine health monitoring is adopted, the attractiveness of using these more complicated schemes can readily be seen.

Author

Spectroscopic Analysis; Rotating Shafts; Resonance; Propulsion System Performance; Optical Measurement; Leakage; Engine Parts; Failure Analysis; Performance Tests; Engine Monitoring Instruments; Engine Analyzers; Systems Health Monitoring; Seals (Stoppers); Rocket Engines; Wear

19980016726 NASA Lewis Research Center, Cleveland, OH USA

Quantification of Gear Tooth Damage by Optimal Tracking of Vibration Signatures

Hendricks, Robert C., NASA Lewis Research Center, USA; Choy, F. K., Akron Univ., USA; Veillette, R. J., Akron Univ., USA; Polyshchuk, V., Akron Univ., USA; Braun, M. J., Akron Univ., USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 775-791; In English; Also announced as 19980016712; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

This paper presents a technique for quantifying the wear or damage of gear teeth in a transmission system. The procedure developed in this study can be applied as a part of either an onboard machine health monitoring system or a health diagnostic system used during regular maintenance. As the developed methodology is based on analysis of gearbox vibration under normal operating conditions, no shutdown or special modification of operating parameters is required during the diagnostic process. The process of quantifying the wear or damage of gear teeth requires a set of measured vibration data and a model of the gear mesh dynamics. An optimization problem is formulated to determine the profile of a time-varying mesh stiffness parameter for which the model output approximates the measured data. The resulting stiffness profile is then related to the level of gear tooth wear or damage. The procedure was applied to a data set generated artificially and to another obtained experimentally from a spiral bevel gear test rig. The results demonstrate the utility of the procedure as part of an overall health monitoring system.

Author

Gear Teeth; Wear; Damage Assessment; Vibration Effects; Optimization; Systems Health Monitoring; Mathematical Models; Maintenance; Structural Vibration

19980016728 NASA Lewis Research Center, Cleveland, OH USA

More Electric Commercial Aircraft Engines (Integral Starter/Generator and Magnetic Bearings)

Kascak, A. F., NASA Lewis Research Center, USA; Brown, G. V., NASA Lewis Research Center, USA; Stefko, G. L., NASA Lewis Research Center, USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 819-846; In English; Also announced as 19980016712; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44125), Hardcopy, Microfiche

The advantages of replacing rolling element bearings with magnetic bearings on the gas generator shaft of a commercial aircraft engine are discussed. This is part of a system that would replace the tower shaft of the engine with an integral starter/generator

on the gas generator shaft; thereby, eliminating the lubrication system and using less secondary air flow to the bearing compartments. Details of the proposed system are presented.

CASI

Aircraft Engines; Commercial Aircraft; Gas Generators; Magnetic Bearings; Engine Design

19980016729 Case Western Reserve Univ., Cleveland, OH USA

Modeling and Design Systems for Integrated Microelectromechanical Devices

Mullen, Robert, Case Western Reserve Univ., USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 847-853; In English; Also announced as 19980016712; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

The problems that are seen in mechanical behavior on the micron scale are discussed. The data presented is from micro electro mechanical systems, but the behavior is, in some respects, similar to what occurs in seals. Model results are shown and are compared to model predictions of experimental results to see where there is success and where there are still flaws in the understanding of the physics of mechanical behavior at the micron level.

Derived from text

Electromechanical Devices; Microelectronics; Mathematical Models; Design Analysis

19980016730 NASA Lewis Research Center, Cleveland, OH USA

Gas Journal Bearing Stability Versus Amplitude Ratio

Hendricks, Robert C., NASA Lewis Research Center, USA; Dimofte, Florin, Toledo Univ., USA; Keith, Theo G., Jr., Toledo Univ., USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 1, pp. 855-864; In English; Also announced as 19980016712

Contract(s)/Grant(s): NAG3-388; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

A gas journal bearing with a wavy surface was tested over a range of speeds up to 18,000 RPM to determine its stability in an unloaded condition as a function of the wave amplitude. The bearing was 50 mm in diameter, 58 mm long and had 0.0165 mm radial clearance. Three waves were created on the inner surface by deforming the bearing sleeve. The ratio of the wave amplitude to the radial clearance (the wave amplitude ratio) was varied from zero to 0.3. It was found experimentally that for wave amplitude ratios equal to 0.187, or larger the bearing ran in a stable mode up to a critical speed after which it began to experience sub-synchronous whirl with a frequency close to one half the synchronous frequency. The speed threshold when the sub-synchronous whirl motion began was found to be a function of the wave amplitude ratio. For example, this threshold speed was 9,650 RPM for a wave amplitude ratio of 0.187 and 17,210 RPM for a wave amplitude ratio of 0.30. However, for wave amplitude ratios smaller than 0.187 (such as 0.024 and 0.157) the bearing became sensitive to sub-synchronous whirl motion at very low speeds. Moreover, it developed a supersynchronous whirling motion with a frequency close to twice the synchronous frequency. A wave amplitude ratio equal to 0.187 or greater than this suppressed both the sub- and super-synchronous whirl motion and allowed the bearing to run in a very stable mode. These experimental data were shown to be in good agreement with numerical predictions.

Author

Frequencies; Journal Bearings; Rotation; Amplitudes; Stability Tests; Standing Wave Ratios

19980016740 National Inst. of Standards and Technology, Materials Reliability Div., Gaithersburg, MD USA

Control of Gas-Metal-Arc Welding Using Arc-Light Sensing

Madigan, R. B., National Inst. of Standards and Technology, USA; Quinn, T. P., National Inst. of Standards and Technology, USA; Siewert, T. A., National Inst. of Standards and Technology, USA; Nov. 1995; 120p; In English

Report No.(s): PB96-131461; NISTIR-5037; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

In this development of closed-loop control of the gas-metal-arc welding process using light emitted by the arc, two process parameters were controlled in real time: arc length and droplet-transfer frequency. An arc-length sensor and controllers to regulate arc length and to actuate welding current were developed. The transfer frequency depended on current, wire-feed speed, and electrode extension, these results led to the design of a transfer-frequency controller.

NTIS

Feedback Control; Arc Welding; Gas Welding; Metals

19980016771 National Inst. for Occupational Safety and Health, Cincinnati, OH USA

In-Depth Survey Report: Control Technology Assessment for the Welding Operations at United Air Specialists, Inc., Cincinnati, Ohio

Wallace, M. E., National Inst. for Occupational Safety and Health, USA; Sheehy, J. W., National Inst. for Occupational Safety and Health, USA; Apr. 1996; 25p; In English

Report No.(s): PB96-191630; ECTB-214-12A; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Sampling surveys of the welding operations were conducted at United Air Specialists, Inc. (SIC-3564), an air cleaning equipment manufacturer in Cincinnati, Ohio. Approximately 30 welders were employed at the facility which operated on a 4 day, 10 hour/day work schedule. No exposures were noted in excess of the OSHA Permissible Exposure Limits for either total particulate or for any sample fume constituents for the air sampling measures collected on welders, a cutter, and a grinder. Air contaminant levels were higher during the cutting operation than during other tasks. Use of a local exhaust system during cutting was not able to completely control the dust and fume exposure. Canopy hoods appeared to effectively control the welding fume exposures, but it was suggested that short term exposures may occur which were not accounted for in these monitoring techniques. The ventilation system used in this study had the drawback that the position of the canopy hood to the part being welded on may result in the welding fume passing directly into the breathing zone of the welder prior to being exhausted. The authors urge all managers to be certain that welders keep their heads out of the welding plume at all times.

NTIS

Contaminants; Welding; Particulates; Occupational Diseases; Exposure; Environmental Surveys; Fumes; Air Purification; Air Sampling

19980016776 Technische Univ., Delft, Netherlands

Development of the Generic Thermodynamic Turboshift Engine Real-Time Simulation (TERTS) Model

van Oosterhout, W. W. P. J., Technische Univ., Netherlands; van Gool, P. C. A., Technische Univ., Netherlands; Dec. 1996; 127p; In English

Report No.(s): PB97-208375; M-790; Copyright Waived; Avail: CASI; A07, Hardcopy; A02, Microfiche

The report describes the development of a turboshift engine real-time simulation model. This model, denoted TERTS (Turboshift Engine Real-Time Simulation), provides the programming environment MAT-LAB/Simulink with a model to predict steady state performance and transient responses of a generic turboshift engine. TERTS is an off-design component stacking model, making it possible to build turboshift engine models by arranging components according to the actual engine configuration. Off-design characteristics of the components are described either by thermodynamic relations or component maps. With these relations and maps internal processes in the engine are described. Effects of deviating operating conditions (a.o. flight conditions, customer bleed extraction, engine component degradation) are implicitly included.

NTIS

Computerized Simulation; Turboshifts; Turbine Engines; Real Time Operation; Mathematical Models; Thermodynamic Properties; One Dimensional Flow

19980016786 Zeus Development Corp., Houston, TX USA

LNG Vehicle Markets and Infrastructure Final Report, Oct. 1994 - Oct. 1995

Nimocks, R., Zeus Development Corp., USA; Sep. 1995; 263p; In English

Report No.(s): PB96-140124; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

A comprehensive primary research of the LNG-powered vehicle market was conducted, including: the status of the LNG vehicle programs and their critical constraints and development needs; estimation of the U.S. LNG liquefaction and delivery capacity; profiling of LNG vehicle products and services vendors; identification and evaluation of key market drivers for specific transportation sector; description of the critical issues that determine the size of market demand for LNG as a transportation fuel; and forecasting the demand for LNG fuel and equipment.

NTIS

Liquefaction; Liquefied Natural Gas

19980016844 Clean Air Vehicle Technology Center, Hayward, CA USA

Natural Gas Vehicle Technology and Fuel Performance Evaluation Program Final Report, Nov. 1994 - May 1997

Bevilacqua, O. M., Clean Air Vehicle Technology Center, USA; Jun. 1997; 80p; In English

Report No.(s): PB97-181275; GRI-97/0184; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This report presents the results of a comprehensive study which examined the impact of natural gas fuel composition variability on natural gas vehicle (NGV) emissions and performance. This study involved eight light-duty NGVs and five different blends

of natural gas. The test vehicles were selected to establish a representative sample of state-of-the-art dedicated and bi-fuel models. Fuel blends included common commercial blends, and other gases representing 'fringe' compositions. For each vehicle-fuel combination, the tests measured vehicle tailpipe and modal emissions, fuel economy, and driveability. Results show that the impacts of fuel variability are generally minor.

NTIS

Natural Gas; Test Vehicles; Performance Tests; Exhaust Gases; Combustion Products

38

QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

19980012612 National Inst. of Standards and Technology, Materials Reliability Div., Gaithersburg, MD USA

Materials Reliability. Technical Activities, 1995

Mchenry, H. I., National Inst. of Standards and Technology, USA; Siewert, T. A., National Inst. of Standards and Technology, USA; Apr. 1996; 107p; In English

Report No.(s): PB96-183082; NISTIR-5748; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Contents include the following: Division Organization; Introduction; Highlights; Research Staff; Technical Activities; Intelligent Processing of Materials; Ultrasonic Characterization of Materials; Micrometer-Scale Measurements for Materials Evaluation; Other Projects; Outputs and Interactions; Recent Publications; Technical and Professional Committee Leadership; Industrial and Academic Interactions; and Appendix: Organizational Charts.

NTIS

Reliability; Ultrasonic Tests; Research and Development; Steels

19980012714 National Inst. of Standards and Technology, Gaithersburg, MD USA

U.S. Certification System from a Government Perspective

Breitenberg, M. A., National Inst. of Standards and Technology, USA; Oct. 1997; 36p; In English

Report No.(s): PB98-104086; NISTIR-6077; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report is designed to provide the reader with an introduction to the U.S. certification system from a governmental perspective. It highlights some of the relationships that exist between federal and state agencies and the private sector and discusses some of the history and philosophy behind the U.S. system.

NTIS

Certification; Standardization; Readers; Government/Industry Relations

19980014445 NERAC, Inc., Tolland, CT USA

Nondestructive Testing of Ceramics (Latest Citations from the NTIS Bibliographic Database)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863295; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning nondestructive testing techniques used to detect flaws or defects in ceramic materials and ceramic bodies. Applications for testing ceramic gas turbine engine materials, high performance structural ceramic materials, and the use of scanning laser acoustic microscopy (SLAM) are presented. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Nondestructive Tests; Ceramics

19980014449 Queens Univ., Dept. of Physics, Kingston, Ontario Canada

Remote Field Eddy Current Defect Interaction Final Report, Dec. 1994 - Nov. 1995

Atherton, D. L., Queens Univ., Canada; Clapham, L., Queens Univ., Canada; Czura, W., Queens Univ., Canada; Mergelas, B. J., Queens Univ., Canada; Smith, S., Queens Univ., Canada; Dec. 1995; 113p; In English

Report No.(s): PB96-165675; GRI-95/0506; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The Remote Field Eddy Current (RFEC) technique uses special low frequency probes inside pipes giving double through-wall transmission. It responds with nearly equal sensitivity to internal or external flaws and is potentially suited to crack detection and measurement. Here a special 'phantom exciter' geometry, using single pipe wall transit, enabled detailed measurements and

Finite Element Analysis (FEA) of defect interactions. Results show that eddy current perturbations dominate in nonferromagnetic pipes although, in steel, magnetic effects generally dominate, except for fine cracks. RFEC defect interactions were interpreted using two types of localized eddy current and, for steel, missing magnetization anomalous sources.

NTIS

Pipelines; Inspection; Defects; Gas Pipes; Eddy Currents; Electric Equipment Tests

19980015128 Georgia Inst. of Tech., School of Materials Science and Engineering, Atlanta, GA USA

Nondestructive 3-Dimensional X-ray Diffraction Tomography of Stress/Strain Distribution around Fatigue Cracks in Al-Li 2090 Final Report, 7 Jan. 1996 - 30 Sep. 1997

Stock, Stuart R., Georgia Inst. of Tech., USA; Oct. 17, 1997; 27p; In English

Contract(s)/Grant(s): N00014-94-I-0726

Report No.(s): AD-A330970; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Synchrotron X-ray microbeams were used to characterize the three-dimensional distribution of macrotexture associated with asperity formation during fatigue crack propagation in Al-Li 2090 T8E41. Nondestructive techniques were developed, and beams formed by a 10 micrometers diameter collimator were applied. Focus was on the center portion of 12.5mm thick plates where macrotexture correlates with asperity geometry. A very distinct type of mesotexture was found: multiple adjacent grains have nearly identical orientations and form substantial volumes of near-single-crystal (NSC) material. Transitions between differently oriented NSC volumes or an NSC region and more randomly oriented grains seem to bound asperities.

DTIC

Aluminum Alloys; Lithium Alloys; Fatigue (Materials); X Ray Diffraction; Tomography; Stress-Strain Relationships; Nondestructive Tests; Crack Propagation; Metal Plates

19980015235 NERAC, Inc., Tolland, CT USA

ISO-9000. (Latest Citations from the Ei Compendex*Plus database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864459; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the ISO-9000 series of quality standards written by the Geneva-based International Standards Organization (ISO). Citations focus on ISO-9000 implementation and registration requirements adopted by the 12 European Economic Community (EC) countries. Certification of quality systems on the basis of the ISO international standard is considered as well as the internal and external auditing processes required for registration. The citations also examine benefits and competitive advantages of receiving ISO-9000 certification, and present case studies of companies that have received certification.

NTIS

Bibliographies; Standards; Economics

19980016089 NERAC, Inc., Tolland, CT USA

Reliability: Mathematical Techniques. (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864442; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning mathematical, statistical, and logic techniques used to develop reliability prediction theories and systems. Topics include fault tree analysis, life testing, failure analysis, probability theory, maximum likelihood estimation, and Bayesian analysis. Computer modeling, simulation, and related programming are discussed.

NTIS

Bibliographies; Reliability; Failure Analysis; Fault Trees; Mathematical Logic; Performance Prediction

19980016372 MIL Systems Engineering, Ottawa, Ontario Canada

Weld Detail Fatigue Life Improvement Techniques Final Report

Kirkhope, K. J., MIL Systems Engineering, Canada; Bell, R., MIL Systems Engineering, Canada; Caron, L., MIL Systems Engineering, Canada; Basu, R. I., MIL Systems Engineering, Canada; Dec. 1996; 145p; In English

Report No.(s): AD-A330035; SR-1379; SSC-400; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Fatigue cracks in steel ships often occur at welded joints where stress concentrations due to the joint geometry are relatively high and the fatigue strength of the weld is reduced in comparison to that of the base metal. This becomes more critical in ships

built of High Strength Steels (HSS) because the fatigue strength of steel in the a welded condition does not increase in proportion to the yield or tensile strength. In many cases, the fatigue performance of severely loaded details can be improved by employing good detail design practices, for example by upgrading the welded detail class to one having a higher fatigue strength. In some cases, however, there may be no better alternatives to the detail in question and modification of the detail may not be practicable. As an alternative to strengthening the structure at a considerable increase in costs, procedures which reduce the severity of the stress concentration at the weld, remove imperfections, and/or introduce local compressive stresses at the weld can be used for improvement of the fatigue life. Similarly, these fatigue improvement techniques can be applied as remedial measures to extend the fatigue life of critical welds that have failed prematurely and have been repaired. to date, weld fatigue life improvement techniques have been successfully applied in several industries. While there has been increasing interest in the application of fatigue life improvement techniques to ship structures, at present there is a lack of guidance on the use of such techniques for design, construction and repair. Hence the key elements of this project were to compile available data on fatigue life improvement techniques, assess the feasibility and practicality for their application to ship details, identify gaps in the technology, and finally to recommend design, construction and repair requirements.

DTIC

Compressibility; Construction; Cracks; Fatigue Life; High Strength; High Strength Steels; Metals; Ships

19980016377 National Inst. of Standards and Technology, Materials Reliability Div., Boulder, CO USA

Green's Functions and Boundary Element Analysis for Modeling of Mechanical Behavior of Advanced Materials

Berger, J. R., National Inst. of Standards and Technology, USA; Tewary, V. K., National Inst. of Standards and Technology, USA; Dec. 1996; 164p; In English

Report No.(s): PB97-137210; NIST/SP-910; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

The use of Green's functions and boundary element analysis for modeling the mechanical behavior of advanced materials was explored by representatives of universities, industries, and National laboratories in a workshop. Discussion groups following the presentation of papers led to the identification of research topics of industrial interest: fracture and damage in heterogeneous and layered materials, characterization of multiphase materials, nondestructive measurement techniques, electrochemical machining technology, and analysis of the growth of thin films.

NTIS

Electrochemical Machining; Mechanical Properties; Thin Films; Boundaries

19980016755 Pennsylvania State Univ., Center for Applied Behavioral Sciences, University Park, PA USA

Climate Survey Development and Organizational Assessment Final Report

Vance, R. J., Pennsylvania State Univ., USA; Westaby, J. D., Pennsylvania State Univ., USA; Jan. 26, 1996; 177p; In English Report No.(s): PB98-100910; MAUTC-III-9610; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This project produced an Organizational Climate Survey (OCS) for PennDOT and an OCS reporting process for PennDOT units (Central Office bureaus, district offices, county maintenance units, etc.). The project began with development and testing of a feedback report format using as a prototype results of the 1993 Employee Involvement and Participation Survey. A Feedback Manual was also developed to provide guidance to managers and Continuous Quality Improvement (CQI) Coordinators on how to conduct survey feedback and action planning sessions with employees. Feedback reports for the Employee Involvement (EI) survey were distributed in December 1994. Work then began on design of the OCS. This was mailed out in May 1995, and OCS Feedback Reports were prepared and distributed in September 1995. This report describes key project activities, summarizes OCS findings, and provides recommendations for future development of the OCS process.

NTIS

Climate; Feedback; Surveys

19980016820 National Inst. of Standards and Technology, Electricity Div., Gaithersburg, MD USA

Classified Bibliography: Insulation Condition Monitoring Methods, 1989-1995

Martzloff, F. D., National Inst. of Standards and Technology, USA; Nov. 1995; 96p; In English

Report No.(s): PB96-131586; NISTIR-5760; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This Bibliography is a complement to the Annotated Bibliography that was initially compiled for identifying promising test methods to detect incipient defects due to aging of cables. That compilation led to the selection of two methods for a demonstration at the National Institute of Standards and Technology (NIST), Partial Discharge Analysis and Time-Domain Spectroscopy. The

literature search covers the period 1989-1995, with emphasis on partial discharge measurements, data reduction and simulation, on measurement of dielectric properties, and to some degree, on insulation aging.

NTIS

Bibliographies; Electrical Insulation; Defects; Nondestructive Tests

19980016851 Sydney Univ., School of Civil and Mining Engineering, Australia

Quality Management Systems on Complex Construction Projects *Topical Report*

Jaafari, A., Sydney Univ., Australia; Hollyoak, D. M., Sydney Univ., Australia; Matthews, B. P., Sydney Univ., Australia; May 1995; 165p; In English

Report No.(s): PB96-160072; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This research report contains the results of a field survey of the application of quality assurance standards AS 3900's series to three large construction projects in Australia. The study was conducted in 1994 in the University of Sydney's School of Civil and Mining Engineering. It was preceded by an earlier and much wider study of the status of quality assurance in the Australian building and construction industry. An in-depth analysis of the responses to a fairly large sample survey of people involved in the construction of three large construction projects has been carried out and included in this report. It has been found that the general approach to the imposition of quality assurance on industry was an ill-devised strategy; that the view from the construction pit on the usefulness of quality assurance is in marked contrast to the aims and objectives of quality assurance; that the communication processes within projects as well as the industry as a whole remain poor; that there is little evidence to confirm that the quality of the finished facilities are influenced by the application of the quality assurance; that the rank and file of the construction industry are not generally converted as far as embracing of the quality standards AS3900's series is concerned.

NTIS

Construction Industry; Surveys; Management Systems; Quality Control

19980016853 National Highway Traffic Safety Administration, Mathematical Analysis Div., Washington, DC USA

Some Dimensions of Data Quality in Statistical Systems

Pierchala, Carl E., National Highway Traffic Safety Administration, USA; Jul. 1997; 22p; In English

Report No.(s): PB98-110422; DOT HS-808-597; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An important objective of a statistical data system is to enable users of the data to recommend (and organizations to take) rational action for solving problems or for improving quality of service or manufactured product. With this view in mind, this paper gives a list of some desired characteristics, or dimensions, of data quality, to be considered when building and maintaining statistical data systems. Some discussion of possible conflicts between different dimensions is given. Finally, data users and decision makers are encouraged to demand data systems of high quality, and system developers are urged to produce such systems.

NTIS

Data Systems; Quality Control

19980016859 Rockwell InterNational Corp., Thousand Oaks, CA USA

Non-Destructive Methods for Inspection of Gas Pipes in Gas Piping Systems *Annual Report No. 2, Nov. 1994 - Oct. 1995*

Addison, R. C., Rockwell InterNational Corp., USA; Mckie, A. D. W., Rockwell InterNational Corp., USA; Safaeinili, A., Rockwell InterNational Corp., USA; Nov. 1995; 26p; In English

Report No.(s): PB96-143623; SC77018; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The overall objective of the program is to demonstrate new sensor technology for the nondestructive inspection of pipes in gas piping systems. Specifically, the authors intend to first establish the feasibility of using laser-based ultrasound (LBU) technology to generate and detect ultrasonic Lamb waves in a gas pipeline. Next they will establish the capability of this approach to detect cracks, wall thinning and pitting in model specimens. Finally they will demonstrate the operation of a breadboard system to inspect and map a pipeline segment containing real or simulated defects.

NTIS

Breadboard Models; Ultrasonic Radiation; Ultrasonics; Walls

39
STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress. For applications see 05 Aircraft Design, Testing and Performance and 18 Spacecraft Design, Testing and Performance.

19980014093 National Inst. of Standards and Technology, Building and Fire Research Lab., Gaithersburg, MD USA

Ultimate Capacity Testing of Laminated Elastomeric Base Isolation Bearings under Axial Loading, 15 Aug. 1995 - 15 Aug. 1996

Bradley, G. L., National Inst. of Standards and Technology, USA; Taylor, A. W., National Inst. of Standards and Technology, USA; Chang, P. C., National Inst. of Standards and Technology, USA; Mar. 1997; 44p; In English

Contract(s)/Grant(s): NIST-70NANB5H0083

Report No.(s): PB97-167530; NISTIR-6002; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Seismic base isolation is one of the most promising concepts in seismic resistant construction to come of age in this century. In an effort to facilitate the use of this technology, the National Institute of Standards and Technology (NIST) has published Guidelines for Pre-Qualification, Prototype and Quality Control Testing of Seismic Isolation Systems (NISTIR 5800). Isolation Systems/Units are broadly grouped into three categories: elastomeric, sliding, and hybrid. A common type of elastomeric isolation system is the ordinary laminated bearing, which consists of layers of elastomer and steel bonded under high temperature and pressure to form an integral bearing that is free of joints (elastomer and rubber are used interchangeably throughout this report). The report presents the results of testing to determine ultimate compression under zero lateral load for four steel and rubber ordinary laminated base isolation units, three of which are geometrically similar.

NTIS

Elastomers; Seismic Waves; Isolation; Compression Tests; Compression Loads; Axial Loads

19980014106 Naval Postgraduate School, Monterey, CA USA

Buckling of Ship Grillages, Part 2

Danielson, D. A., Naval Postgraduate School, USA; Kihl, D. P., Naval Surface Warfare Center, USA; Sep. 1997; 34p; In English
Contract(s)/Grant(s): N00167-96-WR-60226

Report No.(s): AD-A331088; NPS-MA-97-005-Pt-2; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The subject of this report is the mechanical behavior of stiffened plates, basic structural components of ships and submarines. The buckling loads of grillages subjected to axial compression with and without lateral pressure are calculated using a finite element based eigenvalue analysis.

DTIC

Ships; Structural Design; Mechanical Properties; Buckling

19980014207 Naval Postgraduate School, Dept. of Mechanical Engineering, Monterey, CA USA

Development of a Shell Element with Pressure Variation Through the Thickness Progress Report, 1 May - 30 Sep. 1997

Kwon, Young W., Naval Postgraduate School, USA; Sep. 30, 1997; 18p; In English

Contract(s)/Grant(s): N00167-97-WR-70463

Report No.(s): AD-A331693; NPS-ME-97-006; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A shell formulation was developed from a three-dimensional solid. The shell element is an isoparametric element, and has four corner nodes at which there are three displacements and three rotations, independently. Therefore, the element formulation includes the transverse shear deformation and the transverse normal deformation. In addition, the formulation consists of separate components of the mean stress and deviatoric stresses because the Gurson constitutive model for void growth is based on the mean stress and the dilatation. As a result, the Gurson void model can be implemented in the shell formulation at the next stage. The shell element uses the reduced integration along the inplane axes and full integration along the transverse direction. If more accuracy is required along the thickness of the shell, a large number of integration points can be selected in the direction. Verification of the shell element was performed for a plate problem and a shell problem whose analytical solutions were available. The next phase of the work is to implement the Gurson model in the shell element. Once those are successfully completed, the module will be incorporated into the DYSMAS program.

DTIC

Finite Element Method; Failure; Deformation; Shear Stress; Transverse Loads; Displacement; Shells (Structural Forms)

19980014226 NERAC, Inc., Tolland, CT USA

Residual Stresses in Peened and Ground Parts (Latest Citations from Information Services in Mechanical Engineering Database)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863212; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning residual stress and strain due to shot peening and grinding of metal parts. Effects of surface residual stresses, relaxation, and propagation after shot peening and grinding are discussed. Methods to determine residual stress include x-ray diffraction, strain-gauge hole-drilling, and laser holographic interferometry. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Residual Stress; Metal Grinding; Shot Peening; Fatigue (Materials)

19980015170 Texas Univ., Inst. for Advanced Technology, Austin, TX USA

Application of Cavity Expansion Analysis to Penetration Problems

Satapathy, S., Texas Univ., USA; Jul. 1997; 165p; In English

Contract(s)/Grant(s): DAAA21-93-C-0101

Report No.(s): AD-A330177; IAT.R-0136; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Cavity Expansion Analysis (CEA) is extended in three different areas: (a) analysis of ductile targets accounting for finite boundaries and finite ductility; (b) analysis of brittle ceramics considering the cracking and comminution behavior; (c) development of a new penetration model for metals to overcome limitations of the existing models. CEA is modified to account for a finite boundary and to incorporate the effects of finite ductility of metallic targets, which develop tensile cracks. The results of the analyses are shown to be in good agreement with test data. A constitutive behavior based on the current understanding of the brittle behavior is used to derive quasi-static and dynamic cavity expansion pressures. Important material parameters that affect the penetration resistance are identified. The cavity expansion pressure derived in this analysis is in excellent agreement with experimental penetration resistance values. The existing penetration models do not always agree with the experimental penetration behavior of eroding rod projectiles at different velocities. A new approach is hypothesized to model the penetration in ductile targets. In addition to the elastic and plastic zones, a 'damaged zone' zone is recognized in the target. In comparison to the existing models, the new approach shows superior agreement with experimental data, both for low and high velocities.

DTIC

Penetration; Targets; Computerized Simulation; Stress Analysis; Cavities; Modulus of Elasticity; Cracks

19980015196 Naval Postgraduate School, Monterey, CA USA

Linear Structural Stress Analysis of a Hull Girder Penetration and a Short Longitudinal Bulkhead Using Finite Element Modeling

Baumann, Gregg W., Naval Postgraduate School, USA; Jun. 1997; 59p; In English

Report No.(s): AD-A330994; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The objective of this study is to investigate structural shadow zones encountered in shipbuilding design using the I-DEAS (Integrated Design Engineering Analysis Software) software. The term 'shadow zone' refers to areas of low stress concentrations that are caused by lines of stress bending around structural discontinuities. Two ship design situations frequently encountered that result in shadow zones are hull girder penetrations and short structural longitudinal bulkheads. In both of these situations, a long-used rule of thumb is to construct a line with a slope of 1:4 originating from the discontinuity that encompasses the area of low stress. The material within this line is then considered ineffective when computing the section modulus. This can prove to be expensive. However, powerful finite element analysis software is readily available that can analyze the shadow zones in greater detail and possibly minimize the area considered ineffective. This study uses the I-DEAS software to develop finite element models of the cited design situations for a U.S. Navy Frigate, FFG-7 class of ship. It conducts a static structural linear analysis of the ship balanced on a trochoidal wave of height 1.1 VL. The results generated in this study validate the rule of thumb in both situations.

DTIC

Bending; Bulkheads; Discontinuity; Finite Element Method; Girders; Hulls (Structures); Low Concentrations; Marine Technology; Mathematical Models

19980015339 Rice Univ., Dept. of Material Science, Houston, TX USA

Indenter Geometry Effects on the Measurement of Mechanical Properties by Nanoindentation with Sharp Indenters

Tsui, T. Y., Rice Univ., USA; Oliver, W. C., Nano Instruments, Inc., USA; Pharr, G. M., Rice Univ., USA; Jan. 1996; 8p; In English
Contract(s)/Grant(s): DE-AC05-96OR-22464; DE-AC05-76OR-00033

Report No.(s): AD-A332301; CONF-960401--10; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The measurement of mechanical properties by nanoindentation methods is most often conducted using indenters with the Berkovich geometry (a triangular pyramid) or with a sphere. These indenters provide a wealth of information but there are certain circumstances in which it would be useful to make measurements with indenters of other geometries. We have recently explored how the measurement of hardness and elastic modulus can be achieved using sharp indenters other than the Berkovich. Systematic studies in several materials were conducted with a Vickers indenter, a conical indenter with a half-included tip angle of 70.3 deg, and the standard Berkovich indenter. All three indenters are geometrically similar and have nominally the same area-to-depth relationship, but there are distinct differences in the behavior of each. Here, we report on the application of these indenters in the measurement of hardness and elastic modulus by nanoindentation methods and some of the difficulties that occur.

DTIC

Mechanical Measurement; Measuring Instruments

19980015352 MIL Systems Engineering, Ottawa, Ontario Canada

Guideline for Evaluation of Finite Elements and Results *Final Report*

Basu, R. I., MIL Systems Engineering, Canada; Kirkhope, K. J., MIL Systems Engineering, Canada; Srinivasan, J., MIL Systems Engineering, Canada; 1996; 259p; In English

Report No.(s): PB96-153077; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

The scope of the guidelines is confined to linear elastic static and dynamic analysis of surface ship structures using Finite element analysis (FEA). The treatment of dynamic analysis is limited to natural frequency and mode calculation. The emphasis is on the structural assembly level rather than on local details, or on the total ship. Only FEA of structures composed of isotropic materials is addressed, therefore, excluding fiber reinforced plastics and wood. Despite these limitations the guidelines are applicable to the vast majority of ship structure FEAs.

NTIS

Structural Analysis; Evaluation; Static Characteristics; Dynamic Characteristics; Computation; Ships; Structural Members

19980015805 Lehigh Univ., Center for Advanced Technology for Large Structural Systems, Bethlehem, PA USA

Evaluation of Alternative Methods for Fire Rating Structural Elements

Gilvary, K. R., Lehigh Univ., USA; Dexter, R. J., Lehigh Univ., USA; May 1997; 104p; In English

Report No.(s): PB97-184055; ATLSS-97-05; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

A range of computational methods were evaluated for predicting the load capacity of structures subjected to fire. Results were compared to furnace experiments on loaded steel columns and concrete filled tubes. Simple calculations are accurate for simple cases such as steel columns at uniform temperature. Special-purpose finite-element software, SAFIR, was also accurate for members with nonuniform temperature distributions and/or composite cross-sections. SAFIR simulations of a continuous frame showed that it withstood three times the fire-exposure duration predicted from column furnace testing. Computational methods could serve as an alternative to the furnace test method for determining fire resistance ratings.

NTIS

Steel Structures; Stress-Strain Relationships; Columns (Supports); Thermodynamics; Structural Analysis; Stress Analysis; Load Carrying Capacity; Loads (Forces); Concretes

19980016017 Illinois Univ., Dept. of Mechanical Engineering, Chicago, IL USA

Application of the Absolute Nodal Coordinate Formulation to Multibody System Dynamics

Escalona, J. L., Seville Univ., Spain; Hussien, H. A., Illinois Univ., USA; Shabana, A. A., Illinois Univ., USA; May 1997; 47p; In English

Contract(s)/Grant(s): DAAG55-97-I-0303

Report No.(s): AD-A332299; MBS97-1-UIC; ARO-35711.3-EG; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The floating frame of reference formulation is currently the most widely used approach in flexible multibody simulations. The use of this approach, however, has been limited to small deformation problems. In this investigation, the use of the new absolute nodal coordinate formulation in the small and large deformation analysis of flexible multibody systems that consist of interconnected bodies is discussed. While in the floating frame of reference formulation a mixed set of absolute reference and local elastic coordinates are used, in the absolute nodal coordinate formulation only absolute coordinates are used. In the absolute nodal

coordinate formulation, new interpretation of the nodal coordinates of the finite elements is used. No infinitesimal or finite rotations are used as nodal coordinates for beams and plates, instead global slopes are used to define the element nodal coordinates. Using this interpretation of the element coordinates beams and plates can be considered as isoparametric elements, and as a result, exact modeling of the rigid body dynamics can be obtained using the element shape function and the absolute nodal coordinates. Unlike the floating frame of reference approach, no coordinate transformation is required in order to determine the element inertia. The mass matrix of the finite elements is a constant matrix, and therefore, the centrifugal and Coriolis forces are equal to zero when the absolute nodal coordinate formulation is used. The generalized elastic forces, however, become highly nonlinear function of the system coordinates, and as such, little is to be gained from the use of the small strain assumptions. Another advantage of using the absolute nodal coordinate formulation in the dynamic simulation of multibody systems is its simplicity in imposing some of the joint constraints and also its simplicity in formulating the generalized forces due to spring-damper elements. The result obtained in this investigation shows an excellent agreement with the result obtained using floating frame of reference formulation when large rotation-small deformation problems are considered.

DTIC

Coordinate Transformations; Isoparametric Finite Elements; Nonlinear Systems; Finite Element Method; Dynamic Structural Analysis

19980016085 NERAC, Inc., Tolland, CT USA

Constitutive Equations: Plastic and Viscoelastic Properties. (Latest Citations from the Aerospace Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): NASA/TM-96-206846; NAS 1.15:206846; PB96-864244; Copyright Waived; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)); US Sales Only, Microfiche

The bibliography contains citations concerning analytical techniques using constitutive equations, applied to materials under stress. The properties explored with these techniques include viscoelasticity, thermoelasticity, and plasticity. While many of the references are general as to material type, most refer to specific metals or composites, or to specific shapes, such as flat plate or spherical vessels. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Viscoelasticity; Plastic Properties; Constitutive Equations

19980016166 NASA Lewis Research Center, Cleveland, OH USA

A General Reversible Hereditary Constitutive Model, Part 2, Application to a Titanium Alloy

Arnold, S. M., NASA Lewis Research Center, USA; Saleeb, A. F., Akron Univ., USA; Castelli, M. G., NYMA, Inc., USA; Dec. 1997; 26p; In English

Contract(s)/Grant(s): NAG3-1747; RTOP 523-21-13

Report No.(s): NASA-TM-107494; NAS 1.15:107494; E-10792; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Given the mathematical framework and specific viscoelastic model in Part 1 our primary goal in this second part is focused on model characterization and assessment for the specific titanium alloy, TIMETAL 21S. The model is motivated by experimental evidence suggesting the presence of significant rate/time effects in the so-called quasilinear, reversible, material response range. An explanation of the various experiments performed and their corresponding results are also included. Finally, model correlations and predictions are presented for a wide temperature range.

Author

Viscoelasticity; Titanium Alloys; Models

19980016552 Virginia Transportation Research Council, Charlottesville, VA USA

Application of Electromagnetic-Acoustic Transducers for Nondestructive Evaluation of Stresses in Steel Bridge Structures Final Report

Lozev, M. G., Virginia Transportation Research Council, USA; Clark, A. V., Virginia Transportation Research Council, USA; Fuchs, P. A., Virginia Transportation Research Council, USA; Apr. 1996; 43p; In English

Report No.(s): PB96-167978; VTRC-96-R30; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The report presents the results of a study to (1) assess the applicability of electromagnetic-acoustic transducers for nondestructive evaluation of stresses in bridge structures and (2) evaluate the new ultrasonic instruments as an effective technique for stress surveys in bridge structures. Field tests were performed on two bridges, one a simply supported design and the other an integral backwall bridge. Residual stress measurements were made on a vertical scanline in the web at midspan of a simply-supported bridge. Live load measurements were made by determining the normalized change in arrival times of surface waves propa-

gating between two transducers mounted on the bottom flange. Good agreement between strain gage and ultrasonic data was obtained, both for the time-history of strain and also for the equivalent stress range.

NTIS

Electroacoustic Transducers; Nondestructive Tests; Steel Structures; Bridges (Structures); Stress Measurement; Residual Stress

19980016566 Colorado Univ., Dept. of Civil Environmental and Architectural Engineering, Boulder, CO USA

Failure Mechanics of Cohesive-Frictional Materials Final Report, 1 Apr. 1996 - 31 Mar. 1997

William, Kaspar J., Colorado Univ., USA; Sep. 15, 1997; 6p; In English

Contract(s)/Grant(s): F49620-96-I-0112

Report No.(s): AD-A329720; TR-153-7200; AFOSR-TR-97-0503; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Cohesive-frictional materials are known to exhibit strong coupling between the volumetric and deviatoric behavior. The Reynolds effect is responsible for inelastic dilatancy which leads to localized failure modes which vary between tensile decohesion and mixed-mode shear-compression failure in simple shear and triaxial extension. In the course of this project analytical methods were developed to study the formation of discontinuous failure modes in softening and non-associated elastoplasticity. Quantitative localization results were obtained in order to assess the regularization properties of Cosserat continua which feature an internal length scale as compared to classical Boltzmann continua. The balance of angular momentum condition across internal discontinuities did suppress localization in microficheropolar materials except for mode I decohesion. This conversion of discontinuous failure modes was most notable when localization was studied computationally at the border between polar and non-polar behavior.

DTIC

Angular Momentum; Cosserat Surfaces; Discontinuity; Elastoplasticity; Friction Factor

19980016763 Kansas Univ., Dept. of Civil Engineering, Lawrence, KS USA

Concrete Dead Load Deflections of Continuous Steel Girder Composite Bridges Final Report, Jun. 1994 - Mar. 1996

Melhem, H., Kansas Univ., USA; Hu, K. K., Kansas Univ., USA; Niazi, K., Kansas Univ., USA; Mar. 1996; 86p; In English

Contract(s)/Grant(s): KSU-95-6

Report No.(s): PB96-178785; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The study involved two activities: collecting data from the testing of concrete cylinders and laboratory-size beams representative of composite bridge girders and developing a computer program that calculates dead load deflections during construction based on the data from the laboratory testing. The 300 concrete cylinders were tested at ages varying from 2 to 36 hours after pouring to establish stress-strain relations in axial compression. The four composite beams (20 feet long) with 16 strain gages and 4 deflection gages were tested by applying small incremental loads starting soon after the concrete was poured. Based on these measurements, the change in stiffness of the composite beam was computed and the concrete properties evaluated.

NTIS

Bridges (Structures); Girders; Static Loads; Deflection; Cylindrical Bodies; Concretes

19980016843 National Aerospace Lab., Amsterdam, Netherlands

Method to Apply Structure Relevant Impact Damage to Small Structure Relevant Specimens for Damage Tolerance Studies

Ubels, L. C., National Aerospace Lab., Netherlands; Wiggeraad, J. F. M., National Aerospace Lab., Netherlands; Mar. 15, 1997; 20p; In English; 10th; InterNational Conference on Composite Materials, 14-18 Aug. 1995, Whistler, Canada

Report No.(s): PB97-178834; NLR-TR-95126-U; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An approach is presented to represent stiffened composite panels by small but 'structure relevant' (SR-) specimens in compression tests to study failure mechanisms. The necessary support conditions to be applied during low velocity impact tests were determined for the SR-specimens, in order to obtain similar damage as the damage found in stiffened panels. Fractography revealed that the locations of the major delaminations in the SR-specimens due to impact were the same as in stiffened panels. These delaminations occurred where they were expected, suggesting that they can be 'placed' deep inside a laminate for optimum damage tolerance. Initial compression tests on stiffened panels confirmed the high damage tolerance of the configuration considered.

NTIS

Composite Structures; Compression Tests; Impact Damage; Impact Tests; Laminates; Tolerances (Mechanics)

19980016850 Sydney Univ., School of Civil and Mining Engineering, Australia

Single and Multiple Bridged Cracks: Application to Fibre-Reinforced Solids *Topical Report*

Grzybowski, M., Sydney Univ., Australia; Wang, J., Sydney Univ., Australia; Karihaloo, B., Sydney Univ., Australia; May 1995; 38p; In English

Report No.(s): PB96-160064; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The report presents a superposition approach for studying the influence of bridging forces upon the opening of single and multiple cracks in elastic solids under mode I loading. The bridging forces may be purely elastic and proportional to the crack opening displacements, but an elasto-plastic bridging law is more likely to represent reality in a fiber-reinforced solid. The fibers debond from the elastic matrix at a certain critical crack opening and thereafter provide a residual bridging force due to frictional pull-out.

NTIS

Crack Bridging; Crack Opening Displacement; Fracture Mechanics; Concretes; Reinforcement (Structures)

19980016864 Sydney Univ., School of Civil and Mining Engineering, Australia

Effects of Curvature on the Nonlinear Behaviour of Elastic Arches *Topical Report*

Pi, Y. L., Sydney Univ., Australia; Trahair, N. S., Sydney Univ., Australia; Jan. 1996; 40p; In English

Report No.(s): PB96-160106; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Arches are structures which combine the bending member function of transmitting transverse forces with the compression member function of transmitting axial forces. The axial deformations of an arch affect its deformed curvatures, giving rise to some high order curvature terms. These terms are not usually considered in the conventional nonlinear analysis of elastic arches, and their effects have not been investigated adequately. This paper develops a new curved finite element model for the nonlinear analysis of elastic arches which includes the effects of the high order terms in the deformed curvatures, and investigates the effects of these terms on the in-plane nonlinear behavior of elastic arches. The use of deformed curvatures with these high order terms can describe the deformations of arches more accurately. Numerical examples demonstrate that the model is efficient, effective and accurate and that the effects of the high order curvature terms on the in-plane nonlinear behavior of arches are significant in some cases. The nonlinear buckling and postbuckling behaviors of elastic pin-ended arches subjected to uniformly distributed radial loads are investigated numerically using the model. It is found that the existence of a linear bifurcation buckling load is not a sufficient conditions for linear bifurcation buckling to occur; that the effects of prebuckling deformations on the buckling of shallow arches are significant; and that the nonlinear buckling loads may be much lower than the linear buckling loads.

NTIS

Arches; Steel Structures; Curvature; Nonlinear Systems; Elastic Properties

19980016889 Sydney Univ., School of Civil and Mining Engineering, Australia

Behaviour of Cold-Formed Slender SHS Beam-Columns *Topical Report*

Sully, R. M., Sydney Univ., Australia; Hancock, G. J., Sydney Univ., Australia; Sep. 1995; 52p; In English

Report No.(s): PB96-160080; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This research report describes a test program conducted into the behavior of cold-formed square hollow section (SHS) beam-columns of slender cross-section and follows an earlier research report into the behavior of compact SHS beam-columns by the same authors (Sully and Hancock (1994)). The tests were conducted in a purpose built test rig capable of applying load and moment in a constant ratio. The test specimens were pin-ended specimens loaded at two different ratios of end moment. The maximum second order elastic moments are calculated from the maximum applied end moment, and applied load. Comparison of these moments is made with the interaction design rules from AS4100 Specification (SAA (1990)) and the AISC-LRFD Specification (AISC (1994)).

NTIS

Columns (Supports); Structural Analysis; Static Tests; Beams (Supports); Standards

42
GEOSCIENCES (GENERAL)

19980015246 National Weather Service, National Centers for Environmental Prediction, Silver Spring, MD USA

Proceedings of the Annual Climate Diagnostics Workshop

1995; 465p; In English; 20th, 23-27 Oct. 1995, Seattle, WA, USA

Report No.(s): PB96-168646; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

Contents include the following: Recent climate anomalies; Tropical-extratropical interactions; Reanalyses; InterNational program studies; Regional studies; Low frequency variability; Precipitation; General circulation studies; Modeling studies; Aspects of predictability; and Forecasting and verification.

NTIS

Conferences; Climatology; Weather Forecasting; Atmospheric Models

19980015275 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report Final Report

Evans, Diane L., Editor, Jet Propulsion Lab., California Inst. of Tech., USA; Plaut, Jeffrey, Editor, Jet Propulsion Lab., California Inst. of Tech., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996; 271p; In English; Also announced as 19980015276 through 19980015323

Contract(s)/Grant(s): NAS7-1260

Report No.(s): NASA/CR-97-206707; JPL-Publ-96-7; NAS 1.26:206707; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

The Spaceborne Imaging Radar-C/X-band Synthetic Aperture Radar (SIR-C/X-SAR) is the most advanced imaging radar system to fly in Earth orbit. Carried in the cargo bay of the Space Shuttle Endeavour in April and October of 1994, SIR-C/X-SAR simultaneously recorded SAR data at three wavelengths (L-, C-, and X-bands; 23.5, 5.8, and 3.1 cm, respectively). The SIR-C/X-SAR Science Team consists of 53 investigator teams from more than a dozen countries. Science investigations were undertaken in the fields of ecology, hydrology, ecology, and oceanography. This report contains 44 investigator team reports and several additional reports from coinvestigators and other researchers.

Author

Shuttle Imaging Radar; Superhigh Frequencies; Synthetic Aperture Radar; Spaceborne Experiments; NASA Space Programs; Earth Observations (From Space)

19980015349 National Oceanic and Atmospheric Administration, Pacific Marine Environmental Lab., Seattle, WA USA

CTD Measurements during 1995 and 1996 as Part of the Global Ocean-Atmosphere-Land System (GOALS) Pan American Climate Studies (PACS)

Mctaggart, K. E., National Oceanic and Atmospheric Administration, USA; OHaleck, M. K., National Oceanic and Atmospheric Administration, USA; Johnson, G. C., National Oceanic and Atmospheric Administration, USA; Magnum, L. J., National Oceanic and Atmospheric Administration, USA; Aug. 1997; 654p; In English

Report No.(s): PB98-109390; No Copyright; Avail: CASI; A99, Hardcopy; A06, Microfiche

During 1995 and 1996, CTD data were collected in the equatorial Pacific Ocean as part of the Global Ocean-Atmosphere-Land System (GOALS)/Pan American Climate Studies (PACS), follow-up program to the Tropical Ocean Global Atmosphere (TOGA) and Equatorial Pacific Ocean Climate Studies (EPOCS). Summaries of Sea-Bird CTD measurements and hydrographic data acquired on fifteen cruises are presented. Composite potential temperature-salinity diagrams and section plots of oceanographic variables along 95 deg. W, 110 deg. W, 125 deg. W, 140 deg. W, 155 deg. W, 170 deg. W, 180. deg, and 165 deg. E meridionals are given. Profiles including station location, meteorological conditions, and abbreviated CTD data listings are shown for each cast. Hydrographic data are listed of each cruise.

NTIS

Pacific Ocean; Tropical Regions; Climatology; Annual Variations

EARTH RESOURCES AND REMOTE SENSING

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography. For instrumentation see 35 Instrumentation and Photography.

19980012491 Geological Survey, Charleston, WV USA

Water Resources Data for West Virginia, Water Year 1995 Annual Report, 1 Oct. 1994 - 30 Sep. 1995

Ward, S. M., Geological Survey, USA; Taylor, B. C., Geological Survey, USA; Crosby, G. R., Geological Survey, USA; Jun. 1996; 352p; In English

Report No.(s): PB96-192554; USGS/WDR/WV-95/1; No Copyright; Avail: CASI; A16, Hardcopy; A03, Microfiche

Water-resources data for the 1995 water year for West Virginia consists of records of discharge and water quality of streams; contents of reservoirs; and water levels of observation wells. This report contains discharge records for 68 streamflow-gaging stations; annual maximum discharge at 18 crest-stage partial-record stations; change in contents for 1 reservoir, water-quality records for 14 stations; and water-level records for 28 observation wells. Locations of these sites are shown on figures 4 and 5. Additional water data were collected at various sites, not involved in the systematic data collection program, and are published as miscellaneous sites.

NTIS

West Virginia; Water Resources; Water Quality; Surface Water; Ground Water

19980012492 Geological Survey, Trenton, NJ USA

Water Resources Data for New Jersey, Water Year 1995, Volume 2, Ground-Water Data Annual Report, 1 Oct. 1994 - 30 Sep. 1995

Bauersfeld, W. R., Geological Survey, USA; Jones, W. D., Geological Survey, USA; Jul. 1996; 230p; In English

Report No.(s): PB96-192547; USGS/WDR/NJ-95/2; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

Water-resources data for the 1995 water year for New Jersey are presented in two volumes, and consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water. Volume 2 contains records of ground-water levels from 172 wells and water-quality analyses of ground water from 39 wells.

NTIS

New Jersey; Water Resources; Water Quality; Ground Water

19980012493 Geological Survey, Pearl, MS USA

Water Resources Data for Mississippi, Water Year 1995 Annual Report, 1 Oct. 1994 - 30 Sep. 1995

Plunkett, M. L., Geological Survey, USA; Morris, F., Geological Survey, USA; Oakley, W. T., Geological Survey, USA; Turnipseed, D. P., Geological Survey, USA; Jul. 1996; 308p; In English

Report No.(s): PB96-192539; USGS/WDR/MS-95/1; No Copyright; Avail: CASI; A14, Hardcopy; A03, Microfiche

Water resources data for the 1995 water year for Mississippi consist of surface water and ground water in the State. Specifically, it contains: (1) Discharge records for 86 streamflow-gaging stations, stage records for 20 of these gaging stations, discharge records for 80 partial-record or miscellaneous streamflow stations, including 8 flood hydrograph partial-record stations, 54 crest-stage partial-record stations, and 18 special study and miscellaneous sites; (2) stage only at 6 gaging stations; (3) water-quality records for 22 streamflow-gaging stations, 1 ungaged stream site, 9 partial-record or miscellaneous sites, 50 short-term study sites, and 72 wells; and (4) water-level records for 47 observation wells. Records obtained from water-resources investigations are also included in special sections of the report.

NTIS

Water Resources; Surface Water; Ground Water; Mississippi; Hydrology; Water Quality

19980012510 Ohio State Univ., Columbus, OH USA

Report of the First Annual Great Lakes Forecasting System (GLFS) User's Workshop

1995; 13p; In English; 1st; Annual Great Lakes Forecasting System (GLFS) User's Workshop, 22 Sep. 1994, Sandusky, OH, USA

Report No.(s): PB96-172408; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Great Lakes Forecasting System is a real-time coastal prediction system for forecasting, on a daily basis, the physical state of each of the Great Lakes for the next two days. Forecast variables include the surface water level fluctuation, horizontal and vertical structure of temperature and currents, and turbulence. The system uses meteorological observations, satellite data, and forecasts from numerical weather prediction models as input. This meeting was held to solicit feedback from a limited group

of users who had been given access to GLFS products in 1994. Feedback came during this informal meeting in Sandusky and from a questionnaire, which was mailed with the invitation to the meeting.

NTIS

Atmospheric Models; Prediction Analysis Techniques; Real Time Operation; Surface Water; Turbulence; Vertical Distribution; Weather Forecasting

19980012616 Forest Service, Anchorage, AK USA

Use of Aerial Photograph, Channel-Type Interpretations to Predict Habitat Availability in Small Streams. Restoration Project 95505B. EXXON VALDEZ Oil Spill Restoration Project Final Report

Olson, R. A., Forest Service, USA; May 1995; 32p; In English

Report No.(s): PB96-194923; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In-stream habitats were quantified and qualified for nine stream channel-types. The channel types were identified using interpretations from stereo pairs of color and infrared aerial photographs. A total of 70 sites were sampled for streams located on the northwest portion of the Kenai Peninsula, in south-central Alaska. Channel-types were a significant predictor (P less than 0.05) of the area (sq m) for 9 of 13 habitat types. Channel-types that had similar habitat composition, differed in size and depth of those habitats. Spawning habitat also appeared to be correlated to channel-type, however the within channel-type variability caused the differences to test non-significant P less than 0.05.

NTIS

Oil Slicks; Alaska; Peninsulas; Streams

19980013942 Geological Survey, Honolulu, HI USA

Water Resources Data for Hawaii, Water Year 1995 Annual Report, 1 Oct. 1994 - 30 Sep. 1995

Fontaine, R. A., Geological Survey, USA; Taogoshi, R. I., Geological Survey, USA; Kunishige, V. E., Geological Survey, USA; Shibata, W. S., Geological Survey, USA; Jan. 1997; 482p; In English

Report No.(s): PB97-135321; USGS/WDR/HI-95/1; No Copyright; Avail: CASI; A21, Hardcopy; A04, Microfiche

Water-resources data for the 1995 water year for Hawaii consist of records of stage, discharge, and water quality of streams and springs; and water levels and quality of water wells. This report contains discharge records for 91 gaging stations; water quality at 12 gaging stations; 22 partial-record flow stations, and 167 wells; and water levels for 78 observations wells. Also included are 107 crest-stage partial record stations, 4 miscellaneous partial-record stations, 6 low-flow partial-record stations, and 44 rain-fall stations.

NTIS

Water Resources; Water Quality; Hydrology; Hawaii; Surface Water

19980014095 Integrated Petroleum Technologies, Inc., Golden, CO USA

Advanced Stimulation Technology Deployment Program: HS Resources, Inc., Dakota Formation, Blue Forest Unit, Sweetwater County, Wyoming Topical Report, May 1996-Jan. 1997

Skees, J. L., Integrated Petroleum Technologies, Inc., USA; Harkrider, J. D., Integrated Petroleum Technologies, Inc., USA; Middlebrook, M. L., Integrated Petroleum Technologies, Inc., USA; Aud, W. W., Integrated Petroleum Technologies, Inc., USA; Jan. 1997; 92p; In English

Contract(s)/Grant(s): GRI-5094-220-3261

Report No.(s): PB97-168173; GRI-97/0102; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This report summarizes the activities of Integrated Petroleum Technologies, Inc. in transferring the core of GRI advanced stimulation technologies to HS Resources, Inc. for application in the Blue Forest Unit, Sweetwater County, Wyoming. The tangible benefits from improved production responses compared to the previous approaches are documented in the report. The technology transfer program focused on workshops/seminars, real-time evaluation of fracture treatment parameters and proppant placement optimization, and detailed post-treatment evaluations.

NTIS

Technology Transfer; Fracturing; Natural Gas; Reservoirs

19980014101 Geological Survey, Water Resources Div., Reston, VA USA

Physical, Chemical, and Biological Characteristics of the Charlotte Harbor Basin and Estuarine System in Southwestern Florida: A Summary of the 1982 - 1989 US Geological Survey Charlotte Harbor Assessment and Other Studies

McPherson, B. F., Geological Survey, USA; Miller, R. L., Geological Survey, USA; Stoker, Y. E., Geological Survey, USA; 1997; 40p; In English

Report No.(s): PB97-180236; USGS/Water-Supply-Paper-2486; LC-96-51656; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Charlotte Harbor estuarine system, having a surface area of about 270 square miles, average about 7 feet in depth and is connected to deep water of the Gulf of Mexico through several passes and inlets between barrier islands. Freshwater and tidal flushing transport nutrients and other constituents from the basin through the estuary into the gulf. Flushing characteristics were evaluated using a two-dimensional hydrodynamic model. The model indicated that the time required to flush injected dye (simulated) from some subareas of the harbor was longer for reduced freshwater inflow than for typical freshwater inflow.

NTIS

Estuaries; Chemical Properties; Geological Surveys; Bioassay

19980014212 Geological Survey, Water Resources Div., Lawrence, KS USA

Water Resources Data for Kansas, Water Year 1995 Annual Report, 1 Oct. 1994 - 30 Sep. 1995

Putnam, J. E., Geological Survey, USA; Lacock, D. L., Geological Survey, USA; Schneider, D. R., Geological Survey, USA; Carlson, M. D., Geological Survey, USA; Dague, B. J., Geological Survey, USA; Jun. 1996; 502p; In English

Report No.(s): PB96-193388; USGS/WDR/KS-95/1; No Copyright; Avail: CASI; A22, Hardcopy; A04, Microfiche

Water-resources data for the 1995 water year for Kansas consist of records of stage, discharge, and water quality of streams; evaluation, and contents of lakes or reservoirs; and water levels of groundwater wells. This report contains records for water discharge at 144 gaging stations; elevation and contents at 20 lakes or reservoirs; water quality at 4 gaging stations; and water levels at 1,472 observation wells. Also included are data for 26 high-flow and 2 low-flow partial-record stations; and 2 chemical quality of precipitation stations. Miscellaneous onsite water-quality data were collected at 131 measured sites, and miscellaneous suspended-sediment data were collected at 3 sampling sites.

NTIS

Water Resources; Ground Water; Hydrology; Surface Water; Water Flow; Kansas

19980014437 Forest Service, Intermountain Research Station, Ogden, UT USA

Forest Resources of Northern Utah Ecoregions

O'Brien, R. A., Forest Service, USA; Sep. 1996; 39p; In English

Report No.(s): PB97-103923; FSRB/INT-87; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report presents the condition and extent of the forest resources of northern Utah ecoregions. The report also summarizes average net annual growth, potential growth, mortality, number of standing dead trees, habitat type occurrence, fire evidence, ownership, and land use patterns by province.

NTIS

Forests; Land Use; Utah

19980014448 NERAC, Inc., Tolland, CT USA

Digital Maps. (Latest Citations from the INSPEC Database)

Feb. 1996; In English

Report No.(s): PB96-862388; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development and assessment of digital techniques used for geographic maps and mapping. References review digital road, terrain, elevation, polygon, color, and vector maps. Geographic, driver, traffic, and navigation information systems are examined. Digital map databases, data structures, computerized maps, and user-friendly interfaces are included. Topics also cover hidden area detection, terrain-aided navigation, intelligent highway systems, mapping quality evaluation, and road traffic controls. Land uses and environmental issues are also covered. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Maps; Mapping; Digital Data

19980014566 Geological Survey, Water Resources Div., Lansing, MI USA

Water Resources Data for Michigan, Water Year 1996 Annual Report, 1 Oct. 1995 - 30 Sep. 1996

Blumer, S. P., Geological Survey, USA; Behrendt, T. E., Geological Survey, USA; Ellis, J. M., Geological Survey, USA; Minnerick, R. J., Geological Survey, USA; LeuVoy, R. L., Geological Survey, USA; Apr. 1997; 336p; In English

Report No.(s): PB97-159776; USGS/WDR/MI-96/1; No Copyright; Avail: CASI; A15, Hardcopy; A03, Microfiche

This report contains discharge records for 144 streamflow-gaging stations; stage only records for 1 stream-gaging stations and 19 lake-gaging stations; stage and contents for 4 lakes and reservoirs; water-quality records for 15 streamflow-gaging stations and 1 lake-gaging station; water-level records for 35 ground-water wells. Also included are 29 crest-stage partial-record stations and 2 low-flow partial-record stations. Additional water data were collected at various sites not involved in the systematic data-collection program. Miscellaneous data were collected at 28 measuring sites and 3 water-quality sampling sites.

NTIS

Ground Water; Michigan; Reservoirs; Sampling; Water Quality; Water Resources

19980014810 Geological Survey, Water Resources Div., Coram, NY USA

Water Resources Data for New York, Water Year 1995, Volume 2, Long Island Annual Report, 1 Oct. 1994 - 30 Sep. 1995

Spinello, A. G., Geological Survey, USA; Busciolano, R., Geological Survey, USA; Winowitch, R. B., Geological Survey, USA; Eagen, V. K., Geological Survey, USA; 1996; 260p; In English

Report No.(s): PB97-104343; USGS/WDR-NY-95-2; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

Water resources data for the 1995 water year for New York consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground-water wells. This volume contains records for water discharge at 20 gaging stations; water quality at 19 gaging stations, and 20 wells; and water levels at 725 observation wells. Also included are data for 79 low-flow partial-record stations. Additional water data were collected at various sites not involved in the systematic data collection program, and are published as miscellaneous measurements and analyses.

NTIS

Water Resources; New York; Ground Water; Wells; Water Quality; Hydrology

19980015101 NERAC, Inc., Tolland, CT USA

Remote Sensing Applied to Geology (Latest Citations from the Aerospace Database)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-862552; NASA/TM-96-206789; NAS 1.26:206789; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the use of remote sensing in geological resource exploration. Technologies discussed include thermal, optical, photographic, and electronic imaging using ground-based, aerial, and satellite-borne devices. Analog and digital techniques to locate, classify, and assess geophysical features, structures, and resources are also covered. Application of remote sensing to petroleum and minerals exploration is treated in a separate bibliography. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Geological Surveys; Remote Sensing; Geology

19980015166 Geological Survey, Water Resources Div., Anchorage, AK USA

Mass Balance, Meteorological, Ice Motion, Surface Altitude, and Runoff Data at Gulkana Glacier, Alaska, 1993 Balance Year

March, R. S., Geological Survey, USA; Trabant, D. C., Geological Survey, USA; 1997; 39p; In English

Report No.(s): PB97-180996; USGS/WRI-96-4299; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The 1993 measured winter snow, maximum winter snow, net, and annual balances in the Gulkana Glacier basin were evaluated on the basis of meteorological, hydrological, and glaciological data measured in the basin. Ice-surface motion and altitude changes measured at three index sites document seasonal ice speed and glacier thickness changes.

NTIS

Meteorological Parameters; Glaciers; Mass Distribution; Snow; Alaska; Altitude

19980015168 Pinnacle Technologies, Inc., San Francisco, CA USA

Advanced Stimulation Technology Deployment Program: Burlington Resources, Inc., Mesaverde and Desert Creek Formations, San Juan Basin Topical Report, Jun. 1995 - Feb. 1996

Wright, C. A., Pinnacle Technologies, Inc., USA; Weijers, L., Pinnacle Technologies, Inc., USA; Minner, W. A., Pinnacle Technologies, Inc., USA; Jan. 1997; 159p; In English

Contract(s)/Grant(s): GRI-5094-210-3262

Report No.(s): PB97-181317; GRI-97/0051; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

Burlington Resources participated in the AST program to improve their understanding and to identify possible ways to optimize fracture treatment design. Benefits of AST-implementation could be directly determined when working with Burlington in

the Barker Creek Paradox Field, where pressure-out problems (on pad) were experienced. by utilizing AST, it was possible to place all proppant, which would not have been possible in the 'conventional' way. Two wells on which AST was implemented showed a significant post-fracture production increase (almost tripling production).

NTIS

Technology Transfer; Fracture Mechanics; Stimulation; Wells; Reservoirs; Fracturing

19980015191 Forest Service, Portland, OR USA

Predicting the Effect of Fire on Large-Scale Vegetation Patterns in North America *Topical Report*

McKenzie, D., Forest Service, USA; Peterson, D. L., Forest Service, USA; Alvarado, E., Forest Service, USA; Jun. 1996; 43p; In English

Report No.(s): PB97-103840; FSRP-PNW-489; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Potential changes in large-scale vegetation patterns are predicted as a result of altered fire frequencies. A new vegetation classification was developed by condensing Kuechler potential natural vegetation types into aggregated types that are relatively homogeneous with respect to fire regime. Transition rules were developed to predict potential changes from one vegetation type to another because of increased fire frequency. In general, vegetation currently associated with warmer or drier climates could replace existing vegetation in most biomass. The transition rules provide an ecological perspective on possible new configurations of vegetation types, a set of constraints for steady-state models, and a potential method of calibration for dynamic models of large-scale vegetation change.

NTIS

North America; Fires; Forests; Vegetation; Classifications; Biomass; Predictions

19980015192 National Governors Association/Council of State Planning Agencies, Washington, DC USA

Performance Management Practices in the Appalachian Regional Commission Member States

Aug. 1996; 40p; In English

Report No.(s): PB97-103865; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Appalachian Regional Commission adopted a strategic plan, Setting a Regional Agenda, in February 1996 that includes the development of a performance management system. NGA surveyed the Appalachian states to determine the status of each state's performance management practices. Georgia, North Carolina and Virginia are engaged in a government-wide benchmarking process. Over two thirds of the Appalachian states reported some effort to institute meaningful performance practices within a state agency or for an important policy/program area. Evaluation is viewed as an integral part of an overall system in Georgia and Virginia. One-half of the ARC states reported some efforts in performance-based budgeting. Mississippi and Pennsylvania uses some form of performance management practices within their ARC program operations. Some general findings were: performance practices within their ARC program operations. Some general findings were: performance practices are highly diverse across the states; there is a lack of clarity among the states about the terms and process associated with performance management; the claims about progress being made in implementing performance management systems appear to overstate reality; and no state (even nationwide) has fully implemented an overall performance management system that can guide other state efforts.

NTIS

Management Systems; Performance Tests; Effectiveness; Economic Development; Budgeting; Regional Planning

19980015244 Geological Survey, Onalaska, WI USA

Effects of Water Levels on Ecosystems: An Annotated Bibliography. Long Term Resource Monitoring Program

Wlosinski, J. H., Geological Survey, USA; Koljord, E. R., Geological Survey, USA; Dec. 1996; 192p; In English

Report No.(s): PB97-134795; LTRMP-96-TOO7; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This report contains annotations from more than 800 papers and reports describing the effects of water levels on ecosystem components, primarily in fresh waters. An index containing key words is included to facilitate the locations of references on certain subjects. Key words are also grouped into general categories.

NTIS

Bibliographies; Ecosystems; Indexes (Documentation); Annotations

19980015251 Geological Survey, Water Resources Div., Albany, NY USA

Water Resources Data for New York, Water Year 1996, Volume 2, Long Island *Annual Report, 1 Oct. 1995 - 30 Sep. 1996*

Spinello, A. G., Geological Survey, USA; Busciolano, R., Geological Survey, USA; Winowitch, R. B., Geological Survey, USA; Eagen, V. K., Geological Survey, USA; May 1997; 247p; In English

Report No.(s): PB97-181283; USGS/WDR/NY-96/2; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

This volume contains records for water discharge at 19 gaging stations; water quality at 19 gaging stations; and water levels at 679 observation wells. Also included are data for 79 low-flow partial-record stations.

NTIS

New York; Water Quality; Water Resources; Hydrology; Ground Water

19980015278 Canada Centre for Remote Sensing, Applications Div., Ottawa, Ontario Canada

Canada Centre for Remote Sensing Altona, Manitoba test site

Brown, R. J., Canada Centre for Remote Sensing, Canada; Gwyn, H., Sherbrooke Univ., Canada; Pultz, T. J., Canada Centre for Remote Sensing, Canada; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 10-11; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The overall objectives of the experiment were to evaluate the capabilities of multigate, multiparameter SAR data to estimate soil moisture in an agricultural environment for a variety of soil types in the spring and fall, develop models which provide a better understanding on the relationships between soil moisture and texture, surface roughness and radar frequency, polarization and incidence angle, evaluate the use of a change detection approach for soil moisture monitoring and to gain a better understanding of the information content of polarimetric data.

Author

Change Detection; SOil Moisture; Synthetic Aperture Radar; Remote Sensing; Environmental Monitoring

19980015279 GEC-Marconi Research Centre, Great Baddow, UK

A Study of the Potential of Multicomponent SAR Imagery for Agricultural and Forestry Studies

Cordey, Ralph, GEC-Marconi Research Centre, UK; Keye, G. E., Defence Research Agency, UK; Baker, J. R., British National Space Centre, UK; Quegan, S., Sheffield Univ., UK; Foody, G. M., University Coll., UK; Veck, N. J., National Remote Sensing Centre, UK; Wielogorska, A., Hunting Technical Services Ltd., UK; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 12-14; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The objectives of the project are as follows: 1) Develop the methods to fully exploit multicomponent SAR data sets of agricultural and forestry areas; 2) Determine the radiometric information content of multicomponent SAR imagery of agricultural and forested areas by developing backscatter models; 3) Develop techniques for the derivation of specific target information from a multicomponent data set, and consequently determine the optimum set of measurement parameters for use in specifying future SAR missions; and 4) Develop improved image processing techniques for the extraction of specific image attributes from these images.

Derived from text

Backscattering; Image Processing; Radar Imagery; Synthetic Aperture Radar; Image Analysis; Imaging Techniques; Radar Targets

19980015280 King Fahd Univ. of Petroleum and Minerals, Research Inst., Dhahran, Saudi Arabia

Geologic and Hydrologic Studies of Saudi Arabia under the Spaceborne Imaging Radar-C (SIR-C) Science Plan

Dabbagh, Abdallah E., King Fahd Univ. of Petroleum and Minerals, Saudi Arabia; Al-Hinai, Khattab G., King Fahd Univ. of Petroleum and Minerals, Saudi Arabia; Gardner, Weston C., King Fahd Univ. of Petroleum and Minerals, Saudi Arabia; Khan, M. Asif, King Fahd Univ. of Petroleum and Minerals, Saudi Arabia; Tawfiq, Mohammed A., Ministry of Petroleum and Minerals, Saudi Arabia; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 15-31; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The objectives of the project are as follows: 1) Use Synthetic Aperture Radar (SAR) imagery to detect lithological boundaries, distinguish tectonic features, map fluvial geomorphology, and elucidate hydrologic systems within larger areas of Saudi Arabia having a thin sand cover; 2) Establish the Pleistocene paleodrainage system of Saudi Arabia with implications for the hydrology of the country and possibly for archeological geology; and 3) Assess the effects of sand terrain diversities on backscatter intensity as a function of radar parameters.

Derived from text

Imaging Techniques; Radar; Radar Imagery; Saudi Arabia; Shuttle Imaging Radar; Radar Detection

19980015281 California Univ., Center for Remote Sensing and Environmental Optics, Santa Barbara, CA USA

Biomass Modeling of the Ponderosa Pine Forests of Western North America with SIR-C/X-SAR for Input to Ecosystem Models

Davis, Frank W., California Univ., USA; Melack, John M., California Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 32-37; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The objectives discussed in the document are as follows: (1) Integrate existing forest biophysical measurements with field measurements and calibrated aircraft SAR and calibrated SIR-C/X-SAR images to form a spatially registered data set for model development and testing; (2) Extend our L-band radar forest model to X- and C-band and four polarizations; (3) Determine the major backscattering components from a forest using aircraft SAR and SIR-C/X-SAR; and (4) Develop and evaluate an inversion procedure through which the above-ground forest biomass, partitioning, patchiness, and spatial and height distributions within a stand can be estimated from SAR images.

Derived from text

Backscattering; Biomass; Environment Models; Radar Imagery; Shuttle Imaging Radar; Synthetic Aperture Radar; Forests; Ecosystems

19980015282 California Univ., Centre for Remote Sensing and Environmental Optics, Santa Barbara, CA USA

SIR-C Investigations of Snow Properties in Alpine Terrain

Dozier, Jeff, California Univ., USA; Shi, J., California Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 38-42; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The objectives discussed in the paper are as follow: (1) Estimate snow-covered area and distribution of snow water equivalence over alpine drainage basins. Surface material may be trees that are taller than the snow depth, brush, or grass that will be covered by the snow, soil, scree, talus, or bedrock, or glacier ice; (2) Estimate spectral albedo of snow cover; and (3) Model spatial distribution of snow surface energy exchange, melt rate, and snow metamorphism intensively during two-to-four-week periods around SIR-C/X-SAR flights, and less intensively during the rest of the snow season.

Derived from text

Shuttle Imaging Radar; Snow; Snow Cover; Albedo; Radar Imagery; Image Analysis; Energy Transfer

19980015283 NASA Goddard Space Flight Center, Greenbelt, MD USA

Application of SIR-C SAR to Hydrology

Engman, Edwin T., NASA Goddard Space Flight Center, USA; O'Neill, Peggy, NASA Goddard Space Flight Center, USA; Wood, Eric, Princeton Univ., USA; Pauwels, Valentine, Princeton Univ., USA; Hsu, Ann, NASA Goddard Space Flight Center, USA; Jackson, Tom, Agricultural Research Service, USA; Shi, J. C., California Univ., USA; Prietzsch, Corinna, Zentrum fuer Agrarlandschafts- und Landnutzungsforschung e.V., Germany; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 43-47; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The progress, results and future plans regarding the following objectives are presented: (1) Determine and compare soil moisture patterns within one or more humid watersheds using SAR data, ground-based measurements, and hydrologic modeling; (2) Use radar data to characterize the hydrologic regime within a catchment and to identify the runoff producing characteristics of humid zone watersheds; and (3) Use radar data as the basis for scaling up from small scale, near-point process models to larger scale water balance models necessary to define and quantify the land phase of GCM's (Global Circulation Models).

Derived from text

Hydrology Models; Radar Data; Shuttle Imaging Radar; SOIL Moisture; Synthetic Aperture Radar; Watersheds

19980015288 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Differential Radar Interferometry

Goldstein, R. M., Jet Propulsion Lab., California Inst. of Tech., USA; Gabriel, A. K., Jet Propulsion Lab., California Inst. of Tech., USA; Li, Fuk K., Jet Propulsion Lab., California Inst. of Tech., USA; Werner, C. L., Jet Propulsion Lab., California Inst. of Tech., USA; Zebker, Howard, Jet Propulsion Lab., California Inst. of Tech., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 66-67; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress and future plans regarding the following objectives are presented: (1) Test differential radar interferometry as a new monitoring technique for remote sensing of a forest site, a farm site, and a desert site; and (2) Generate topographic maps of test sites from radar data.

Derived from text

Differential Interferometry; Radar Data; Remote Sensing; Shuttle Imaging Radar; Image Analysis; Image Processing; Topography

19980015293 Environmental Research Inst. of Michigan, Radar Science lab., Ann Arbor, MI USA

Estimation of Total Aboveground Biomass in Southern USA Old-Field Pine

Kasischke, Eric S., Environmental Research Inst. of Michigan, USA; Christensen, Norman, Duke Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 84-87; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The overall goal of the NASA-sponsored research project is to develop methods to use spaceborne SAR imagery to monitor patterns of carbon storage in the pine forests found in the southeastern USA. This project is part of an overall program being carried out by scientists at ERIM and Duke to develop techniques to use satellite-based remote sensors to monitor carbon flux in this region. Towards this end, funding has also been secured from the Environmental Protection Agency to pursue research beyond the scope of the SIR-C project. Specifically, EPA funding is being used to obtain and analyze LANDSAT TM and MSS imagery over the test site to monitor changes in forest cover in this region from 1975 to present, to develop models describing patterns of below-ground carbon storage, and to develop an integrated approach using information derived from SIR-C and LANDSAT with ground-based models to study landscape scale patterns of carbon storage and flux. Specific objectives of the overall program are to: (1) Develop optimum algorithms to estimate aboveground biomass/carbon in pine forests of the southeast U.S. using multi-channel, spaceborne SAR data; (2) Develop models which link aboveground biomass/carbon with ground-layer carbon in pine forests in the southeast U.S.; (3) Based on (1) and (2) above, estimate patterns of carbon storage in the pine forests surrounding Durham, North Carolina at the times of the SIR-C overflights; (4) Evaluate the utility of using SIR-C/X-SAR data to improve maps of forest cover in the study region; (5) Develop methods to monitor changes in forest cover from 1975 to 1994 in the study site using LANDSAT TM and MSS data; and (6) Develop methods to combine the information derived from LANDSAT and SIR-C data to study patterns of carbon flux over the past 20 years.

Derived from text

Biomass; Carbon; Forests; Radar Imagery; Shuttle Imaging Radar; Synthetic Aperture Radar; Remote Sensing; Environment Models; Radar Data; Carbon Cycle

19980015295 Massachusetts Inst. of Tech., Dept. of Electrical Engineering, Cambridge, MA USA

SIR-C Polarimetric Radar Image Simulation and Interpretation Based on Random Medium Model

Kong, Jin A., Massachusetts Inst. of Tech., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 90-95; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Progress, significant results, and future plans are discussed in regard to the following objectives: (1) Demonstrate the applicability of the random medium model in simulating SIR-C imagery; (2) Analyze and interpret SIR-C imagery for remote sensing applications; and (3) Investigation of seasonal variations and atmospheric effects.

Derived from text

Polarimetry; Radar Imagery; Remote Sensing; Shuttle Imaging Radar; Computerized Simulation; Biomass; Forests; Vegetation

19980015296 Analytical Imaging and Geophysics, LLC, Boulder, CO USA

Comparative Lithological Mapping using Multipolarization, Multifrequency Imaging Radar and Multispectral Optical Remote Sensing

Kruse, Fred A., Analytical Imaging and Geophysics, LLC, USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 96-103; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The objectives of this research have evolved over time based on experience with the data, definition of available SIR-C sites, and the availability of resources. The following summarizes the main objectives of the research: (1) to develop a better understanding of the current geomorphic expression of rock surfaces by determining the relationship between lithological variability, weathering, soil development, and vegetation distribution; (2) To use variation in radar backscatter as a function of wavelength and polarization to characterize the geometry, and indirectly the composition of rock units. (3) To compare radar characterization with visible/infrared characterization of surface materials; and (4) to map the character and distribution of lithological variation with

SIR-C/X-SAR by preparing detailed lithologic maps of selected sites. Progress, significant results, and future plans are also included.

Derived from text

Backscattering; Characterization; Imaging Radar; Remote Sensing; Rocks; Shuttle Imaging Radar; SOIs; Surface Properties; Image Analysis

19980015297 Centre d'Etude Spatiale des Rayonnements, Toulouse, France

Relating Radar Backscatter Responses to Woody and Foliar Biomass of Pine Forests

Toan, Thuy Le, Centre d'Etude Spatiale des Rayonnements, France; Hoozeboom, P., Physics and Electronics Lab. TNO, Netherlands; Fiumara, A., Telespazio S.p.A., Italy; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 104-107; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress, future plans, and publications are presented regarding the following objectives: (1) Demonstrate the use of spaceborne SAR images to detect forest parameters (biomass of different parts of the canopy); and (2) Increase the understanding of the interaction between microwaves and vegetation canopies.

Derived from text

Backscattering; Biomass; Canopies (Vegetation); Forests; Microwaves; Radar Imagery; Synthetic Aperture Radar; Image Analysis

19980015299 California Univ., Dept. of Biological Sciences, Santa Barbara, CA USA

Determining the Extent of Inundation on Tropical and Subtropical Floodplains beneath Vegetation of Varying Types and Densities

Melack, John N., California Univ., USA; Hess, Laura, California Univ., USA; Wang, Yong, California Univ., USA; Filoso, Solange, California Univ., USA; Valeriano, Dalton, California Univ., USA; Mertes, Leal, California Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 111-117; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Progress, significant results and future plans are discussed regarding the following project objectives: (1) Develop a procedure for recovering the presence, absence, and patchy presence of water and its spatial distribution beneath different floodplain plant communities of varying crown closures, densities, stand geometries, and canopy states for sites in Georgia. Test the applicability of the procedure to the Amazon and Alligator river floodplains in Brazil and Australia; (2) Modify, extend, and verify the Santa Barbara radar model for different floodplain vegetation types and densities; (3) Test both discrimination procedures and model predictions for leaf-on/leaf-off and water-on/water-off states against SIR-C/X-SAR and aircraft radar images; and (4) Couple the above modeling and discrimination procedures for floodwater detection and delineation for input to conceptual flood stage/flood area hydrologic models.

Derived from text

Flood Plains; Hydrology Models; Radar Imagery; Shuttle Imaging Radar; Spatial Distribution; Synthetic Aperture Radar; Water Balance

19980015303 Instituto Univ. Nobile, Naples, Italy

SIR-C/X-SAR Data Analyses in Campania Test Site

Murino, Pasquale, Instituto Univ. Nobile, Italy; Castellano, Lucio, Instituto Univ. Nobile, Italy; Russo, Luciano, Instituto Univ. Nobile, Italy; Ferri, Mario, Instituto Univ. Nobile, Italy; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 137-142; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The overall objective of this investigation is the evaluation of SIR-C/X-SAR data collected over the Campania test site in geological analyses. Specific objectives include the following: to determine effective procedures to process SAR data to extract information useful in geological analyses, in particular lithology mapping; to evaluate the relative utility of multifrequency quad-pol SAR data in morphostructural analyses. In particular a processing algorithm based on a covariance matrix approach, which permits us to take advantage of the polarization agility of dual-channel multifrequency SAR, has been developed. Unfortunately only one quad-pol single-look image was available so a great amount of work was carried out on dual-pol data which do not allow a complete electromagnetic characterization of targets.

Derived from text

Image Processing; Shuttle Imaging Radar; Mapping; Radar Data; Image Analysis; Synthetic Aperture Radar

19980015304 California State Univ., Dept. of Biology, Fresno, CA USA

[Impact of Tropical Forest Fragmentation on Local Populations of Species using SIR-C/X-SAR Data]

Paris, Jack F., California State Univ., USA; Taylor, Elizabeth, University of Northern Arizona, USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 143-144; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress, significant results and future plans regarding the following project objectives are presented: (1) Study the impact of tropical forest fragmentation on local populations of endangered and threatened species of certain mammals, butterflies, birds and plants. Vegetation information from SIR-C/X-SAR data over three tropical-forest intensive-study sites will aid an independent, broader study of forest fragmentation and its effects on biodiversity; (2) Add the unique, detailed information on forest fragmentation from spacecraft-based SAR to the broader study begun in 1988; (3) Use imaging data from the LANDSAT Multispectral Scanner (MSS) and the National Oceanographic and Atmospheric Agency (NOAA) Advanced Very-High Resolution Radiometer (AVHRR) to assess on a biome scale, but with less spatial resolution than that of the SIR-C/X-SAR data; and (4) Evaluate the use of the unique information about forest distributions and stand conditions expected from multiparameter synthetic aperture radar (SAR) relative to that from the MSS and AVHRR.

Derived from text

Imaging Techniques; Endangered Species; Shuttle Imaging Radar; Synthetic Aperture Radar; Tropical Regions; Rain Forests; Fragmentation

19980015305 California Univ., Department of Land, Air and Water Sources, Davis, CA USA

Turbulent Exchange at Vegetated Surfaces and Evaluation of Estimates of Canopy Structure using SIR-C Data

Paw U, Kyaw Tha, California Univ., USA; Shaw, Roger, California Univ., USA; Ustin, Susan, California Univ., USA; Paris, Jack, California State Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 145-150; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Progress is discussed regarding the following project objectives: (1) To characterize the turbulent exchanges of momentum, heat and gases from plant surfaces; (2) to evaluate the effects of foliage density, structure and height on the exchanges; and (3) to evaluate the use of SIR-C/X-SAR remotely sensed data for estimating information regarding the type, structure, and status of vegetation needed for estimating the exchanges of momentum, heat and gases.

Derived from text

Turbulence; Vegetation; Turbulent Heat Transfer; Turbulent Mixing; Canopies (Vegetation); Gas Exchange; Momentum Transfer; Turbulent Boundary Layer; Surface Reactions

19980015306 Geo Eco Arc Research, La Canada, CA USA

SIR-C/X-SAR Investigations of Wetland Hydrology in the Seasonal Tropics

Pope, Kevin O., Geo Eco Arc Research, USA; Paris, Jack F., California State Univ., USA; Rejmankova, Eliska, California Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 151-152; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress, significant results and future plans are discussed in relation to the following objectives: (1) Demonstrate the capabilities of spaceborne multifrequency polarimetric SAR imagery for monitoring seasonal flooding in tropical and subtropical regions; and (2) Use the SIR-C/X-SAR imagery to map spatial patterns of wetland communities and determine spatial and temporal patterns of inundation in conjunction with a variety of ecological and geological studies. These studies include monitoring of breeding sites of the malaria transmitting mosquito, studies of wetland biogeochemical gradients, and studies of groundwater discharge systems and their relationship to the buried Chicxulub impact crater.

Derived from text

Hydrology; Radar Imagery; Shuttle Imaging Radar; Synthetic Aperture Radar; Tropical Regions; Wetlands; Remote Sensing; Image Analysis; Floods; Thematic Mapping

19980015307 NASA Goddard Space Flight Center, Greenbelt, MD USA

SIR-C/X-SAR: Imaging Radar Analyses for Forest Ecosystem Modeling

Ranson, K. Jon, NASA Goddard Space Flight Center, USA; Shugart, Herman, Virginia Univ., USA; Smith, James A., NASA Goddard Space Flight Center, USA; Sun, Guoqing, Science Systems and Applications, Inc., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 153-158; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Progress, significant results and future plans are discussed relating to the following objectives: (1) Ecosystem characterization using SIR-C/X-SAR and AirSAR data; (2) Improving radar backscatter models for forest canopies; and (3) Using SAR measurements and models with forest ecosystem models to improve inferences of ecosystem attributes and processes.

Derived from text

Ecosystems; Environment Models; Shuttle Imaging Radar; Synthetic Aperture Radar; Radar Data

19980015308 Innsbruck Univ., Inst. for Meteorology and Geophysics, Austria

High Alpine SAR Experiment

Rott, Helmut, Innsbruck Univ., Austria; Floricioiu, D.-M., Innsbruck Univ., Austria; Nagler, T., Innsbruck Univ., Austria; Siegel, A., Innsbruck Univ., Austria; Maetzler, C., Bern Univ., Switzerland; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 159-163; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The High Alpine SAR Experiment is aimed at the development of methods and the demonstration of applications of multifrequency polarimetric SAR for investigations of high alpine environments with emphasis on snow and glacier applications. The main activities, including extensive field campaigns and data analysis, were related to the test site Oetztal in the Central Alps of Austria which had been selected as SIR-C/X-SAR supersite for snow hydrology and glaciology. Complementary investigations on snow applications were carried out in the region near Innsbruck, where different snow types than at the high alpine site Oetztal were observed during SRL-1 in April 1994. Valuable glaciological information was derived from SIR-C/X-SAR data also for Viedma Glacier and Moreno Glacier of the Southern Patagonian Icefield. On Moreno Glacier the PI is leading a glaciological research project involving field measurements and satellite data analysis.

Derived from text

Glaciers; Shuttle Imaging Radar; Synthetic Aperture Radar; Snow Cover; Radar Data; Image Analysis; Snow

19980015309 Geological Survey, Flagstaff, AZ USA

SIR-C Surface and Subsurface Responses from Documented Test Localities in the Sahara, Namib, and Kalahari Deserts, Africa and the Jornada del Muerto, New Mexico

Schaber, Gerald G., Geological Survey, USA; McCauley, John F., Geological Survey, USA; Breed, Carol S., Geological Survey, USA; Simonin, Andre, Centre National de la Recherche Scientifique, France; Rebillard, Philip, Matra Cap Systemes, France; Lancaster, Nicholas, Desert Research Inst., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 164-169; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Progress, significant results and future plans are reported pertaining to the following project objectives: (1) to determine the optimum SIR sensor configuration for detection of desert duricrust and to use this understanding to reconstruct the paleoclimatic history of two large desert regions in Africa; (2) To determine the ability of SIR-C/X-SAR (alone and synergistically with other remotely sensed data) to delineate and map near-surface, regional caliche deposits and other "fossil" duricrusts formed during a series of less and intervals in Africa, but now obscured by aeolian sand; and (3) to test various sensor parameter configurations of SIR-C/X-SAR for discriminating among surface and near-surface stratigraphic units in well documented sites from the SIR-A and SIR-B experiments. The results will be used to calibrate the penetration and backscattering capabilities of the SIR-C/X-SAR.

Derived from text

Deserts; Remote Sensing; Sands; Shuttle Imaging Radar; Surface Properties; Image Analysis; Radar Data

19980015311 New South Wales Univ., Dept. of Applied Geology, Kensington, Australia

Geology and Hydrology Projects: Australia

Taylor, Geoffrey R., New South Wales Univ., Australia; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 179-189; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The project is discussed in regard to the following objectives: (1) To assess the utility of multipolarization multifrequency spaceborne radar for surficial sediment mapping (lithology, rock weathering, and geochronology,) and groundwater management (arid regimes) in a variety of Australian environments; and (2) to establish the utility of the SIR-C imagery for recognizing basement structures (tectonics and geologic boundaries) by mapping drape-related fractures in overlying surficial sediments.

Derived from text

Ground Water; Mapping; Shuttle Imaging Radar; SOIL Mapping; Image Analysis; Radar Geology; Hydrogeology; Multispectral Radar; Radar Imagery; Australia

19980015312 Michigan Univ., Radiation Lab., Ann Arbor, MI USA

Polarimetric Radar Observations of Forest State for Determination of Ecosystem Processes

Ulaby, Fawwaz T., Michigan Univ., USA; Dobson, M. Craig, Michigan Univ., USA; Sharik, T., Utah Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 190-195; In English; Also announced as 19980015275

Contract(s)/Grant(s): JPL-951869; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The objectives of this research are to test the hypotheses that ecologically significant forest state parameters may be estimated from SAR data. These include estimation of above ground biomass, plant water status, and near surface soil moisture under certain forest conditions. Test hypotheses in the northern hardwoods forest community, refine them if necessary, and establish techniques for retrieving this information from orbital SARs such as SIR-C/X-SAR. This report summarizes (1) recent progress, (2) significant results and (3) research plans concerning SIR-C/X-SAR research.

Author

Ecosystems; Forests; Shuttle Imaging Radar; Synthetic Aperture Radar; Radar Imagery; Image Analysis

19980015314 Naples Univ., DISIS, Italy

Passive and Active Calibrators for Multifrequency and Multiangle X-SAR/SIR-C Image Radiometric and Geometric Corrections

Vetrella, Sergio, Naples Univ., Italy; Moccia, Antonio, Naples Univ., Italy; Ponte, Salvatore, Naples II Univ., Italy; Posa, Francesco, Bari Univ., Italy; Schena, Vincenzo, CO.RIS.T.A., Italy; DeCarolis, Giacomo, Italian Space Agency, Italy; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 198-200; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The objective of the study is to prove that despite the considerable number of variables contributing to SIR-C/X-SAR image formation, the data can reveal system descriptors by studying the system response to "known targets" (either point-like or extended) within the scene. Progress, significant results and future plans of the project are presented.

Derived from text

Calibrating; Shuttle Imaging Radar; Radiometric Correction; Geometric Rectification (Imagery); Radar Imagery; Multispectral Radar; Synthetic Aperture Radar

19980015315 Centre de Recherches en Physique de l'Environnement, Velizy, France

Test of Roughness and Moisture Algorithms using Multiparameter Spaceborne SAR and Application to Surface Hydrology

Vidal-Madjar, Daniel, Centre de Recherches en Physique de l'Environnement, France; Normand, M., Centre Machinisme Agricole Genie Rural Eaux Forets, France; Taconet, O., Centre des Etudes Terrestre et Planetaire, France; Mascle, S., Centre des Etudes Terrestre et Planetaire, France; Zribi, M., Centre des Etudes Terrestre et Planetaire, France; Emblanch, C., Centre Machinisme Agricole Genie Rural Eaux Forets, France; Loumagne, C., Centre Machinisme Agricole Genie Rural Eaux Forets, France; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 201-214; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The objectives of the study are to: (1) Evaluate the usefulness of radar-derived parameters in surface hydrology; (2) Demonstrate the usefulness of the squint mode in the case of bare soil observations; and (3) Compare various roughness/moisture algorithms in a real space imaging mode. Progress, significant results and future plans regarding these objectives are presented.

Derived from text

Algorithms; Imaging Techniques; Surface Roughness; Hydrogeology; SOII Moisture; Synthetic Aperture Radar; Radar Imagery

19980015316 NASA Goddard Space Flight Center, Greenbelt, MD USA

SIR-C Measurements of SOII Moisture, Vegetation and Surface Roughness and their Hydrological Application

Wang, James R., NASA Goddard Space Flight Center, USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 215-217; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The objectives of the study are: (1) Analysis of SIR-C/X-SAR response to soil moisture, vegetation and surface roughness and development of an algorithm to retrieve these parameters; (2) Combination of the visible and near-infrared data and the SIR-C/X-SAR data to improve the range and accuracy of vegetation classification; (3) Testing of theoretical models for microwave propagation with SIR-C/X-SAR and microwave radiometric measurements over rough surfaces; and (4) Evaluation of a water

balance model using SIR-C/X-SAR derived soil moisture values and other ancillary data. Progress, significant results and future plans are presented.

Derived from text

Shuttle Imaging Radar; Hydrology Models; Radar Data; Synthetic Aperture Radar; Radar Imagery; Surface Roughness; Vegetation; SOIL Moisture

19980015317 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen, Germany

Information Extraction from Shuttle Radar Images for Forest and Agricultural Applications

Winter, Rudolf, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Keil, Manfred, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Foerster, B., Ludwig-Maximilians-Univ., Germany; Ammer, U., Ludwig-Maximilians-Univ., Germany; Haas, A., Ludwig-Maximilians-Univ., Germany; Kuebach, W., Bonn Univ., Germany; Davidson, M., Bonn Univ., Germany; Mauser, W., Ludwig-Maximilians-Univ., Germany; Rombach, M., Ludwig-Maximilians-Univ., Germany; Koch, B., Freiburg Univ., Germany; Mohan, S., RSA, India; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 218-221; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The experiment will attempt to extract suitable polarimetric information for objectives of forest mapping and vegetation monitoring as well as for agricultural purposes. In forest areas in Bavaria (e.g., near the Oberpfaffenhofen supersite and in the Bavarian Forest) and in the Harz Mountains, shuttle data are to be evaluated for different forest formations, age classes and other forest parameters and for the forest situation, e.g., concerning storm damages. In the rainforest study areas in Brazil, especially in the states of Acre and Rondonia, SIR-C and X-SAR data are to be analyzed for differentiation of land cover classes like primary rainforest, initial and intermediate regrowth, clean pastures and overgrown pastures. by comparison of April and October data, information is to be gained on the dynamics of deforestation by clearing and burning and on other land use changes. In the supersite Oberpfaffenhofen, the potential for crop classification is to be investigated, in comparison to other test sites like Montespertoli and Matera. The effect on polarimetric backscatter responses is to be studied in relation to biomass and biophysical parameters of vegetation, especially for agricultural purposes. The assessment of soil moisture conditions is another aspect under study in the Oberpfaffenhofen/Weilheim area and in a test site in Gujarat/India.

Derived from text

Agriculture; Forests; Land Use; Polarimetry; Radar Imagery; Shuttle Imaging Radar; Synthetic Aperture Radar; Thematic Mapping; Radar Data; Image Analysis

19980015319 Stanford Univ., STAR Lab., Stanford, CA USA

Radar Interferometric and Penetration Investigations using SIR-C Data

Zebker, Howard A., Stanford Univ., USA; Elachi, Charles, Jet Propulsion Lab., California Inst. of Tech., USA; vanZyl, Jakob, Jet Propulsion Lab., California Inst. of Tech., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 228-230; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress, significant results, publications and future plans are discussed in relation to the following objectives: (1) to model, experimentally characterize, and verify penetration phenomena in hyperarid and vegetated regions using the SIR-C/X-SAR multi-parameter radar system and groundbased receivers; (2) to invert measured radar backscatter as a function of frequency and polarization in terms of geophysical parameters of the surface, subsurface and vegetation canopy such as surface roughness, subsurface geomorphology, or tree height and density; and (3) to display subsurface and within-canopy features in an image format, thus easing the interpretability of the results.

Derived from text

Backscattering; Canopies (Vegetation); Geomorphology; Penetration; Shuttle Imaging Radar; Surface Roughness; Synthetic Aperture Radar; Radar Imagery; Image Analysis

19980015320 Alenia Spazio S.p.A., Rome, Italy

[Processing Tools to Produce Three-dimensional Images from SAR Sensors]

Bombaci, Ornella, Alenia Spazio S.p.A., Italy; Impagnatiello, Fabrizio, Alenia Spazio S.p.A., Italy; Torre, Andrea, Alenia Spazio S.p.A., Italy; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 231-237; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Alenia Spazio has developed, on internal funds, a complete set of processing tools to produce three-dimensional images of the observed area using two complex images coming from SAR sensors like ERS-1 and SIR-C/X-SAR. This paper describes the

processing of the complex SAR data to obtain the 3-D representation of the image. In the frame of interferometric processing some steps have been pointed out: the evaluation of range and azimuth shifts between the two images; the filtering of the complex data in order to improve the coherence between the images; the extraction and filtering of the interferogram; the phase unwrapping; the phase-to-height conversion. The entire processing technique has been tested and applied to images coming from SIR-C/X-SAR (and ERS-1) on Monte Etna in Sicily, in order to evaluate the eventual differences between the two kinds of sensors in terms of radar wavelength, baseline, and repetition time of the images.

Author

Interferometry; Shuttle Imaging Radar; Radar Imagery; Image Analysis; Image Processing; Synthetic Aperture Radar; Image Filters

19980015321 Bonn Univ., Inst. fuer Pflanzenbau, Germany

[Remote Sensing in Agriculture]

Davidson, Malcolm, Bonn Univ., Germany; Steingieber, Roland, Bonn Univ., Germany; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 238-242; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Remote sensing in agriculture has a number of inherent advantages with respect to conventional data gathering methods since it can: (1) Image a large area in a very short time. Thus the data possess a high degree of actuality and have a high economic value; (2) Provide area-wise information as compared to the traditional point-wise sampling techniques. The ability to produce crop maps as well as statistics is considered particularly important for crop studies at regional and local levels; (3) Advance the distribution and timeliness of the thematic information that is essential for the planning, policy making and management of agriculture; and (4) Act as a stratifier in that it can help stratify large regions according to land-use or agroclimatological conditions. While active radar systems have demonstrated considerable potential in collecting information over agricultural lands, the full-potential of SAR systems has not yet been realized due to the low dimensionality of the data recorded by existing earth-orbiting SAR systems such as ERS- I and JERS-1. These operate at a single frequency and polarization, which limits their sensitivity to crop geometry and hence crop type, and condition. The two SIR-C/S-SAR shuttle missions provided the first opportunity to collect multi-frequency multi-polarization images over a number of sites worldwide. While the missions took place at non-optimal times during the growing season (i.e. early and late) for agricultural applications in Europe, a number of images were taken over agricultural areas characterized by distinct climatic conditions and soil types, different crop types or similar crops but at different development stages and subject to varying crop management practices. The research at the Institut fuer Pflanzenbau has focused so far on using this wealth of data in terms of the two basic aspects of agricultural remote sensing; the recognition of crop types over a large area on the basis of self-similar but distinct backscatter characteristics for each crop of agricultural land-cover type and, the mapping of the biophysical status of certain crop types. Ground truth data was collected in three very different test sites (Oberpfaffenhofen in southern Germany, Oltrepo Pavese in northern Italy, and Matera in southern Italy) during the first mission and in two sites (Oberpfaffenhofen again and Flevoland, Holland) during the second mission. The general aim was therefore to judge the sensitivity of the multi-dimensional SIR-C/X-SAR radar data to the biophysical condition of crops and their utility for large scale agricultural inventories.

Author

Radar Data; Remote Sensing; Shuttle Imaging Radar; Synthetic Aperture Radar; Radar Imagery; Image Analysis; Crop Identification; Agriculture; Thematic Mapping

19980015322 Naples Univ., Italy

[Innovative Processing Codes and Architectures for Interferometric SAR Image Generation and Real-Time SAR Data Processing]

Franceschetti, G., Naples Univ., Italy; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 243-244; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Research activity has been developed in the following areas: (1) Development of innovative processing codes for Interferometric SAR (IFSAR) image generation; and (2) Development of innovative architectures for real-time SAR data processing. The research activity is briefly summarized and appropriate references provided.

Author

Architecture (Computers); Data Processing; Real Time Operation; Image Processing; Error Correcting Codes

19980015350 Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO USA

AQUARIUS: A Modeling System for River Basin Water Allocation

Diaz, G. E., Rocky Mountain Forest and Range Experiment Station, USA; Brown, T. C., Rocky Mountain Forest and Range Experiment Station, USA; Sep. 1997; 180p; In English

Report No.(s): PB98-110166; FSGTR-RM-299; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This report describes the initial version (V96) of AQUARIUS, a state-of-the-art computer model devoted to the temporal and spatial allocation of water flows among competing traditional and nontraditional water uses in a river basin. AQUARIUS is an analysis framework rather than a single dedicated model for water allocation. Water systems are ideal candidates for modeling under an OOP framework, where each system component (e.g., reservoir, demand area, diversion point, river reach) is an object in the programming environment.

NTIS

River Basins; Mathematical Models; Allocations; Water Management

19980015397 Geological Survey, Water Resources Div., Lemoyne, PA USA

Evaluation of Agricultural Best-Management Practices in the Conestoga River Headwaters, Pennsylvania: Effects of Nutrient Management on Quality of Surface Runoff and Ground Water at a Small Carbonate-Rock Site Near Ephrata, Pennsylvania, 1984 - 1990

Hall, D. W., Geological Survey, USA; Lietman, P. L., Geological Survey, USA; Koerkle, E. H., Geological Survey, USA; 1997; 73p; In English

Report No.(s): PB97-179600; USGS/WRI-95-4143; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report describes research conducted at Field-Site 2, which was located in the Conestoga Headwaters Basin immediately north of Ephrata in Lancaster County, Pa. The primary objective of this report is to compare land-use and water-quality data from the period before nutrient-management practices were implemented (pre-BMP period--water years 1985-86, October 1, 1984, through September 30, 1986), with data from the period after implementation of nutrient-management practices (post-BMP period--water years 1987-90, October 1, 1986, through September 30, 1990) to determine the effects of nutrient management on water quality. A second objective of this report is to evaluate the movement of nitrogen at the site.

NTIS

Agriculture; Drainage; Ground Water; Procedures; Water Quality

19980015399 National Park Service, Water Resources Div., Fort Collins, CO USA

National Park Service, Water Resources Division Annual Report, 1996

Jun. 1997; 129p; In English

Report No.(s): PB97-209399; NPS/NRWRD/NRR-97/06; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This Annual Report provides a summary of the significant accomplishments of the Water Resources Division (WRD) of the National Park Service (NPS) in 1996. The Division carried out a broad-based water resources program involving leadership in a variety of activities, including water rights; water quality; floodplain management; ground water analysis; watershed and wetlands protection; water resources management planning; fishery management; policy, legislative, and regulatory analysis; information management; and training.

NTIS

Information Management; Management Planning; National Parks; Resources Management; Water Quality; Water Resources; Watersheds

19980015401 Research Inst. of National Defence, Tumba, Sweden

Mitigation Effects of Water on Ground Shock: Large Scale Testing in Aelvdalen Vattendaempning av Markvibrationer: Foersok i Stor Skala i Aelvdalen

Hansson, H., Research Inst. of National Defence, Sweden; Forsen, R., Research Inst. of National Defence, Sweden; May 1997; 67p; In English

Report No.(s): PB97-206965; FOA-R-97-00510-311-SE; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Water is considered to give a mitigation effect on air blast from detonations. A large scale experiment, sponsored by the countries of the KLOTZ-Club and Singapore, has been performed in the KLOTZ-Club tunnel in Aelvdalen. The purpose of the experiment was to compare the effects of a previous shot in the tunnel without water mitigation with a similar shot with water in proximity of the charge. The charge comprises 180 artillery shells (caliber 15.2 cm) that were detonated simultaneously inside the tunnel.

Total weight of TNT was 1000 kg. Close to the charge, 2000 kg of water was placed in 25 liter plastic barrels. In comparison between the previous and the present experiment, it was found that the pressure inside the tunnel were of the same magnitude.

NTIS

Blasts; Water; Aerial Explosions

19980015403 Environmental Protection Agency, Chesapeake Bay Program, Annapolis, MD USA

Priorities for Action for Land, Growth and Stewardship in the Chesapeake Bay Region

Oct. 10, 1996; 41p; In English

Report No.(s): PB97-105944; CBP/TRS-152/96; EPA/903/R-96/010; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Land, Growth and Stewardship Subcommittee recommends that the Chesapeake Executive Council accept this report on 'Priorities for Action for Land, Growth and Stewardship in the Chesapeake Bay Region' (referred to as the 'Priorities for Action') as a way to implement the 1987 Chesapeake Bay Agreement population growth and development commitments. The 'Priorities for Action' reflect the ideas and suggestions of over 300 public officials and private interests within the region and the leadership of the Committees, Subcommittees and related workgroups within the Chesapeake Bay Program. This report documents the process used to develop these 'Priorities for Action,' outlines future Land, Growth and Stewardship Subcommittee activities, and identifies specific recommendations. These recommendations are supported within and outside the Bay Program and will contribute to the restoration of the Bay, while supporting sustainable development patterns.

NTIS

Chesapeake Bay (US); Environment Management

19980015410 Geological Survey, Water Resources Div., Albuquerque, NM USA

Water Quality Assessment of the Rio Grande Valley, Colorado, New Mexico, and Texas: Fish Communities at Selected Sites, 1993 - 1995

Carter, L. F., Geological Survey, USA; 1997; 34p; In English

Report No.(s): PB97-180988; USGS/WRI-97-4017; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The report describes fish communities at selected sites in the Rio Grande Valley study unit and relates the structure of these fish communities to the physical and chemical characteristics of the streams. Fish communities were sampled at 10 sites in the study unit from June 1993 through September 1995. The influence of a stream's physical and chemical characteristics on the fish community was determined through regression, correlation, and multivariate statistical analysis, and community structure analysis.

NTIS

Marine Biology; Fishes; Water Quality; Multivariate Statistical Analysis; Ecosystems; River Basins

19980015415 Geological Survey, Water Resources Div., Sacramento, CA USA

Water Resources Data for California, Water Year 1996, Volume 1, Southern Great Basin from Mexican Border to Mono Lake Basin and Pacific Slope Basins from Tijuana River to Santa Maria River Annual Report, 1 Oct. 1995 - 30 Sep. 1996

Rockwell, G. L., Geological Survey, USA; Hayes, P. D., Geological Survey, USA; Agajanian, J., Geological Survey, USA; Jul. 1997; 443p; In English

Report No.(s): PB97-186076; USGS/WDR/CA-96/1; No Copyright; Avail: CASI; A19, Hardcopy; A04, Microfiche

Water-resources data for the 1996 water year for California consist of records of stage, discharge, and water quality of streams, stage and contents in lakes and reservoirs, and water levels and water quality in wells. Volume 1 contains discharge records for 149 gaging stations and 6 crest-stage partial-record stations, stage and contents for 21 lakes and reservoirs, gage height records for 1 station, water quality for 19 streamflow-gaging stations and 17 partial-record stations, and precipitation data for 4 stations. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State and Federal agencies in California.

NTIS

California; Water Resources; Water Quality; Surface Water; Hydrology

19980015419 Geological Survey, Water Resources Div., Rapid City, SD USA

Water Resources Data for South Dakota, Water Year 1996 Annual Report, 1 Oct. 1995 - 30 Sep. 1996

Burr, M. J., Geological Survey, USA; Teller, R. W., Geological Survey, USA; Neitzert, K. M., Geological Survey, USA; May 1997; 381p; In English

Report No.(s): PB97-181333; USGS/WDR/SD-96/1; No Copyright; Avail: CASI; A17, Hardcopy; A03, Microfiche

This report contains discharge records for 135 streamflow-gaging stations; stage and contents records for 10 lakes and reservoirs, stage for 7 streams and 3 lakes; water-quality records for 5 streamflow-gaging stations, 3 wells, 9 ungaged stream sites, 5 lakes, 1 sewage lagoon, and 1 precipitation site; water levels for 7 wells; daily precipitation records at 45 sites; and 24 partial-record crest-stage gage sites.

NTIS

Water Resources; South Dakota; Water Quality; Surface Water; Ground Water; Hydrology

19980015437 Geological Survey, Water Resources Div., Albuquerque, NM USA

Ground-Water Resources of Catron County, New Mexico

Basabivazo, G. T., Geological Survey, USA; 1997; 148p; In English

Report No.(s): PB97-158836; USGS/WRI-96-4258; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This report describes the occurrence, availability, and quality of ground-water and related surface-water resources in Catron County, the largest county in New Mexico. The county is located in the Lower Colorado River Basin and the Rio Grande Basin, and the Continental Divide is the boundary between the two river basins. Increases in water used for mining activities (coal, mineral, and geothermal), irrigated agriculture, reservoir construction, or domestic purposes could affect the quantity or quality of ground-water and surface-water resources in the county.

NTIS

Water Resources; Surface Water; Ground Water; New Mexico; Hydrogeology

19980015612 Geological Survey, Water Resources Div., Rapid City, SD USA

Estimation of Flood Flows on the Big Sioux River between Akron, Iowa, and North Sioux City, South Dakota

Niehus, C. A., Geological Survey, USA; 1996; 24p; In English

Report No.(s): PB97-108856; USGS/WRI-96-4121; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The purpose of this report is to present estimated flood flows for the 10-, 50-, 100-, and 500-year recurrence intervals at selected locations on the Big Sioux River between the Akron streamflow-gaging station and North Sioux City. Various methods were used to define a range of flood flows that could be expected for the various recurrence intervals. The estimated flood flows are presented to support a FEMA Flood Insurance Study for a portion of Union County and for North Sioux City.

NTIS

Floods; Rivers; Flood Predictions; River Basins; Water Flow; Flow Velocity; Watersheds

19980015614 Iowa Dept. of Natural Resources, Bellevue, IA USA

Upper Mississippi River System Long Term Resource Monitoring Program: Water and Sediment Component *Annual Report*

Gent, R. D., Iowa Dept. of Natural Resources, USA; Steuck, M. J., Iowa Dept. of Natural Resources, USA; Gould, D. E., Iowa Dept. of Natural Resources, USA; Griffin, M. K., Iowa Dept. of Natural Resources, USA; Gritters, S. A., Iowa Dept. of Natural Resources, USA; Sep. 1996; 54p; In English

Report No.(s): PB97-103758; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

A total of 8,382 observations were recorded by the LTRMP water quality component in Pool 13 during the sampling period January 1 through December 31, 1989. Data collected in 1989 reflect water quality characteristics during a second consecutive year of low water conditions.

NTIS

Mississippi River (US); Sediments; Water Quality

19980015626 Washington Univ., Dept. of Civil Engineering, Seattle, WA USA

Use of a One-Dimensional Snow Cover Model to Analyze Measured Snow Depth and Snow Temperature Data from Southern Finland *Final Report*

Koivusalo, H. J., Washington Univ., USA; Burges, S. J., Washington Univ., USA; Mar. 1996; 122p; In English

Report No.(s): PB96-187851; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

A multilayered one-dimensional snow model which accounted for the relevant mass and energy transfer processes, was used to model the properties of a winter snowpack. Measurements of snow cover mass, vertical temperature, and meteorological variables were available at an experimental site in Southern Finland for the 1993-94 winter season. The quality of data was checked by comparing the measured meteorological variables with those at the nearest weather stations. The experimental site measurements were used to determine the relevant soil and snow initial conditions for the model. The model results indicated that the calculated snow mass and temperature were in good agreement with the measurements and the model was able to simulate the formation

of an ice layer immediately above the soil surface. The sensitivity of the model to prescribed systematic and random perturbations in the input data series was examined.

NTIS

Snow Cover; Mathematical Models

19980015632 Institute of Gas Technology, Des Plaines, IL USA

Fracture Enhanced In-situ Foam Remediation Topical Report, Jul. 1995 - Dec. 1996

Chowdiah, P., Institute of Gas Technology, USA; Misra, B. R., Institute of Gas Technology, USA; Conrad, J. R., Institute of Gas Technology, USA; Srivastava, V. J., Institute of Gas Technology, USA; Jun. 1997; 55p; In English

Contract(s)/Grant(s): GRI-5095-260-3465; IGT Proj. 30680

Report No.(s): PB97-181291; GRI-97/0214; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The objective of this project was to determine the technical feasibility of soil fracturing as an enhancement to transportation of foam and foam-assisted site remediation. This project is part of an overall effort by the Gas Research Institute (GRI) to develop technologies for cost-effective, in-situ remediation of soils.

NTIS

Foams; Fracturing; Technology Assessment; SOILs; SOIL Science

19980015633 Forest Service, Southwestern Region, Albuquerque, NM USA

Arizona's Wildland-Urban Interface: National Forest Fuels Reduction Treatment Proposals

May 1997; 12p; In English; Original contains color illustrations

Report No.(s): PB97-178131; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Land management agencies in Arizona are actively working with communities and homeowners to implement treatments on public lands and provide assistance to private landowners. After the severe 1996 fire season, more people than ever want to do more on their private land and help design projects on public land to make their property safer. The Arizona National forest will continue as willing partners to keep wildland-urban interface forests safer for people and in a more natural condition. The unnaturally dense forest conditions found on 237,000 priority 1 urban-interface acres of National forest took several decades to develop. It will take a long time and a lot of money to accomplish that initial work needed. It will also take regular maintenance treatments to reduce the continual buildup of vegetation that occurs naturally.

NTIS

Forests; Fuels; Vegetation; Forest Management; Forest Fires; Fire Control; Cities; Urban Research

19980015654 Geological Survey, Water Resources Div., Albuquerque, NM USA

Chlorofluorocarbon and Tritium Age Determination of Ground-Water Recharge in the Ryan Flat Subbasin, Trans-Pecos Texas Final Report

Bartolino, J. R., Geological Survey, USA; 1997; 34p; In English

Report No.(s): PB97-156384; USGS/WRI-96-4245; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report presents water-quality data and CFC and tritium age dates of ground-water samples collected from 10 wells in the Ryan Flat subbasin. Age dates of ground water were used to determine the time of ground-water recharge (the time ground water became isolated from the unsaturated zone) in the study area. To this end, CFC concentrations and tritium activities in water from 10 wells in the Ryan Flat subbasin are described. Additionally, other water-quality properties and constituents from these 10 wells are described and discussed. The report also includes the methodology used, presentation and interpretation of the data, and discussion of the results.

NTIS

Chlorofluorocarbons; Water Quality; Chemical Analysis; Tritium; Ground Water; Water Resources

19980015741 Geological Survey, Water Resources Div., Portland, OR USA

Water Resources Data for Oregon. Water Year 1996 Annual Report, 1 Oct. 1995 - 30 Sep. 1996

Hubbard, L. E., Geological Survey, USA; Herrett, T. A., Geological Survey, USA; Poole, J. E., Geological Survey, USA; Ruppert, G. P., Geological Survey, USA; Courts, M. L., Geological Survey, USA; Oct. 1997; 470p; In English

Report No.(s): PB98-107576; USGS/WDR/OR-96/1; No Copyright; Avail: CASI; A20, Hardcopy; A04, Microfiche

Water resources data for the 1996 water year for Oregon consist of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs, and water levels of wells, including water discharge for 195 gaging stations on streams, canals and drains; discharge data for 109 partial-record or miscellaneous sites and water-quality sampling sites; stage and (or)

contents for 38 lakes and reservoirs; water-quality data for 71 streams, canals, lakes and wells; water-quality for 2 atmospheric deposition sites; air-temperature records for 1 data sites; and light incident for 1 record.

NTIS

Surface Water; Ground Water; Hydrology; Oregon; Water Resources

19980015752 Forest Service, Washington, DC USA

Patterns of Demographic, Economic and Value Change in the Western USA

Case, P., Forest Service, USA; Alward, G., Forest Service, USA; Aug. 1997; 118p; In English

Report No.(s): PB98-113061; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This report describes, in a nontechnical manner, the changing face of the Western population and economy as it is occurring in the large scale. The report begins with a brief discussion of long-term demographic trends, and then turns to recent patterns of change in demography, economics, social perceptions about the environment, and peoples' values for land, water, and economic prosperity. The second part of the report deals with projections of future population growth and change in the West. It concludes with a brief discussion of the implications these changing large-scale social forces have for water use and management in the West.

NTIS

Water Management; Economic Analysis; Land Use; Water Resources; Demography

19980016031 Colorado Univ., Dept. of Geography, Boulder, CO USA

Western Land Use Trends and Policy: Implications for Water Resources *Final Report*

Riebsame, W. E., Colorado Univ., USA; Wescoat, J., Colorado Univ., USA; Morrisette, P., Colorado Univ., USA; Sep. 1997; 162p; In English

Report No.(s): PB98-113558; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This paper has the following six parts. Part I, 'Land Use and Land Use Policy', discusses what is 'land use' and 'land cover', land use theory, the land use policy regime, and some environmental protection policy cases. Part II, 'General Land Use Trends: Global, National, and Western U.S.', considers the global land use situation, U.S. trends, and Western U.S. land use and cover trends. Part III, 'The Land and Water Nexus in the West', looks at assessing the land use-water policy nexus, and evolving relations between land use and water in the West. Part IV, 'Western Urban, Suburban, and Exurban Land Use and Water', describes western urban and suburban land use patterns, urban and exurban growth, and western urban water use. Part V, 'Agricultural Land Use in the West', considers agricultural land loss, agricultural land use conversion process, whether environmental regulation increases farm and ranch land conversion, and gives a look at some western agricultural issues and cases. Part VI, provides trends and recommendations.

NTIS

Water Resources; Land Use; Policies; Environment Protection

19980016136 Southern Research Inst., Birmingham, AL USA

Evaluation and Analysis of Gas Content and Coal Properties of Major Coal Bearing Regions of the USA *Final Report, Sep. 1993 - Feb. 1996*

Masemore, S., Southern Research Inst., USA; Piccot, S., Southern Research Inst., USA; Ringler, E., Southern Research Inst., USA; Diamond, W. P., Bureau of Mines, USA; Jun. 1996; 176p; In English

Report No.(s): PB96-185491; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

The report is a compilation of quality assured data on gas content and coal-bed reservoir properties for 11 major coal bearing regions in the U.S. The primary source of these data is the U.S. Bureau of Mines (BOM) gas content measurements program conducted during the 1970s and 1980s. In order to enhance the utility of the BOM data, an evaluation was conducted to compile and quality assure the original data, and to adjust the data as needed to improve quality and representativeness. The raw data were digitized to allow a computer to accurately and consistently perform routine quality assurance checks, consistently determine lost gas and total gas contents for each sample, and examine various corrections to the data. In addition, desorption constants for each coal sample were determined from time series desorption curves generated from the original data. Additional data presented include the results of equilibrium adsorption isotherm tests performed by the U.S. Department of Energy (DOE) in 1983 for approximately 100 of the BOM coal samples.

NTIS

Coal; Methane; Reservoirs; Gas Analysis; Quality Control; Desorption

19980016309 Geological Survey, Water Resources Div., Atlanta, GA USA

Water Resources Data for Georgia, Water Year 1995 Annual Report, 1 Oct. 1994 - 30 Sep. 1995

Stokes, W. R., Geological Survey, USA; Mcfarlane, R. D., Geological Survey, USA; Jun. 1996; 638p; In English
Report No.(s): PB96-188644; USGS/WDR/GA-95/1; No Copyright; Avail: CASI; A99, Hardcopy; A06, Microfiche

Water-resources data for the 1995 water year for Georgia consists of records of stage, discharge, and quality of streams; stage and contents of lakes and reservoirs; ground-water levels; and precipitation quality. The report contains discharge records of 119 gaging stations; stage for 26 gaging stations; stage and contents for 18 lakes and reservoirs; water quality for 125 continuing-record stations; and peak stage and discharge only for 102 crest-stage partial-record stations; water levels of 24 observation wells, and water quality for 1 precipitation-quality site.

NTIS

Georgia; Ground Water; Hydrology; Water Resources; Data Acquisition

19980016371 Geological Survey, Water Resources Div., Lincoln, NE USA

Water Resources Data for Nebraska, Water Year 1996 Annual Report, 1 Oct. 1995 - 30 Sep. 1996

Boohar, J. A., Geological Survey, USA; Walczyk, V. C., Geological Survey, USA; Mar. 1997; 396p; In English
Report No.(s): PB97-161202; USGS/WRD/NE-96/1; No Copyright; Avail: CASI; A17, Hardcopy; A04, Microfiche

This report contains discharge records for 86 streamflow-gaging stations, 5 partial-record or miscellaneous stream-flow stations, and 4 crest-stage, partial record streamflow stations; stage and contents record for 7 lakes and reservoirs; water-quality records for 10 streamflow-gaging stations, for 8 ungaged streamsites, and for 314 wells; and water levels for 56 observation wells.

NTIS

Water Quality; Water Resources; Wells; Nebraska; Reservoirs

19980016379 Environmental Protection Agency, National Health and Environmental Effects Research Lab., Corvallis, OR USA
Ecoregions of Tennessee

Griffith, G. E., Environmental Protection Agency, USA; Omernik, J. M., Environmental Protection Agency, USA; Azevedo, S. H., OAO Corp., USA; Apr. 1997; 59p; In English

Report No.(s): PB97-156863; EPA/600/R-97/022; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

We have defined ecological regions of Tennessee at two hierarchical levels that are consistent and compatible with the U.S. EPA ecoregion framework. Eight level 3 ecoregions and twenty-five level 4 ecoregions have been mapped for Tennessee. A multi-agency cooperative effort also resulted in the identification of potential stream reference sites within the Tennessee ecoregions. Streams that are representative of the ecoregion and are minimally disturbed and least impacted from point and non-point source pollution can serve as suitable reference streams. The ecoregions and reference sites can be used to better understand regional variations in stream quality, assess attainable conditions, develop biological criteria, and augment the watershed management approach.

NTIS

Point Sources; Watersheds

19980016547 Geological Survey, Water Resources Div., Boise, ID USA

Water Resources Data for Idaho, Water Year 1995, Volume 2, Upper Columbia River Basin and Snake River Basin Below King Hill Annual Report, 1 Oct. 1994 - 30 Sep. 1995

Brennan, T. S., Geological Survey, USA; Odell, I., Geological Survey, USA; Lehmann, A. K., Geological Survey, USA; Tungate, A. M., Geological Survey, USA; May 31, 1996; 380p; In English

Report No.(s): PB96-188594; USGS/WDR/ID-95/2; No Copyright; Avail: CASI; A17, Hardcopy; A03, Microfiche

Water resources data for the 1995 water year for Idaho consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; discharge of irrigation diversions; and water levels and water quality of groundwater. The two volumes of the report contain discharge records for 191 stream-gaging stations and 36 irrigation diversions; stage only records for 4 stream-gaging stations; stage only for 9 lakes and reservoirs; contents only for 23 lakes and reservoirs; water-quality for 104 stream-gaging stations and partial record sites, 430 wells; daily totals for 1 precipitation gage; and water levels for 553 observation wells. Additional water data were collected at various sites not involved in the systematic data collection program and are published as miscellaneous measurements.

NTIS

Idaho; Ground Water; Hydrology; Water Resources; Data Acquisition

19980016548 Geological Survey, Water Resources Div., Boise, ID USA

Water Resources Data for Idaho, Water Year 1995, Volume 1, Great Basin and Snake River Basin Above King Hill Annual Report, 1 Oct. 1994 - 30 Sep. 1995

Brennan, T. S., Geological Survey, USA; Lehmann, A. K., Geological Survey, USA; ODell, I., Geological Survey, USA; Tungate, A. M., Geological Survey, USA; May 31, 1996; 484p; In English

Report No.(s): PB96-188586; USGS/WDR/ID-95/1; No Copyright; Avail: CASI; A21, Hardcopy; A04, Microfiche

Water resources data for the 1995 water year for Idaho consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; discharge of irrigation diversions; and water levels and water quality of groundwater. The two volumes of the report contain discharge records for 191 stream-gaging stations and 36 irrigation diversions; stage only records for 4 stream-gaging stations; stage only for 9 lakes and reservoirs; contents only for 23 lakes and reservoirs; water-quality for 104 stream-gaging stations and partial record sites, 430 wells; daily totals for 1 precipitation gage; and water levels for 553 observation wells. Additional water data were collected at various sites not involved in the systematic data collection program and are published as miscellaneous measurements.

NTIS

Idaho; Ground Water; Hydrology; Water Resources; Data Acquisition

19980016623 NERAC, Inc., Tolland, CT USA

Computer Aided Mapping. (Latest Citations from the NTIS Bibliographic Database)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-856000; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning theoretical aspects and applications of computer aided mapping in cartography. Citations discuss digital mapping, databases, data compression, coding, and remote sensing. Satellite image analysis and processing techniques, and descriptions of specific mapping projects are discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Computer Aided Mapping

19980016635 Geological Survey, Water Resources Div., Rapid City, SD USA

Water Resources Data for South Dakota, Water Year 1995 Annual Report, 1 Oct. 1994 - 30 Sep. 1995

Burr, M. J., Geological Survey, USA; Teller, R. W., Geological Survey, USA; Neitzert, K. M., Geological Survey, USA; May 1996; 402p; In English

Report No.(s): PB96-191192; USGS/WDR/SD-95/1; No Copyright; Avail: CASI; A18, Hardcopy; A04, Microfiche

Water-resources data for the 1995 water year for South Dakota consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; precipitation; and water levels in wells. This report contains discharge records for 138 streamflow-gaging stations; stage and contents records for 10 lakes and reservoirs, stage for 7 streams and 4 lakes; water-quality records for 8 streamflow-gaging stations, 4 daily sediment stations, 3 wells, 10 ungaged stream sites, 5 lakes, 1 sewage lagoon, and 1 precipitation sites; water levels for 7 wells; daily precipitation records at 46 sites; and 22 partial-record crest-stage gage sites. Additional water data were collected at various sites, not part of the systematic data-collection program, and are published as miscellaneous measurements and analyses.

NTIS

South Dakota; Ground Water; Hydrology; Data Acquisition

19980016637 Bureau of Reclamation, Technical Service Center, Denver, CO USA

Global Climate Change Response Program: Development and Application of a Physically Based Distributed Parameter Rainfall Runoff Model in the Gunnison River Basin Final Report

Ryan, T., Bureau of Reclamation, USA; Mar. 1996; 123p; In English

Report No.(s): PB96-178843; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

A physically based distributed parameter rainfall runoff model was developed for the upper Gunnison River Basin in Western Colorado. The model was developed using the Precipitation Runoff Modeling System (PRMS), running inside the Modular System (MMS) graphical framework. The model was used to perform global climate change analysis in the Gunnison River Basin. The rainfall runoff model predicts a decrease in streamflows of 5 percent. Sensitivity model runs were performed on an array of

altered historical climate data. These model simulations show that streamflows change significantly as precipitation and temperature change.

NTIS

Climate Change; Climatology; Hydrology Models; Multimission Modular Spacecraft; River Basins

19980016648 South Dakota School of Mines and Technology, Dept. of Civil and Environmental Engineering, Rapid City, SD USA

Techniques for Estimating Hydrologic Parameters for Small Basins in Florida *Final Report*

Kenner, S. J., South Dakota School of Mines and Technology, USA; Hall, R. L., South Dakota School of Mines and Technology, USA; Bender, D. A., South Dakota School of Mines and Technology, USA; Muck, D. M., South Dakota School of Mines and Technology, USA; Apr. 1996; 130p; In English

Contract(s)/Grant(s): FDOT Proj. 997700-3542-119

Report No.(s): PB96-178835; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The objective of the hydrologic analysis presented here is to improve coefficient estimation for hydrologic methods used to estimate runoff volumes and peak flows for design of hydraulic structures. The hydrologic methods and associated coefficients being evaluated are the Santa Barbara Urban Hydrograph Method (SBUTH - k), Baumgartner Morris Modified Rational Method (RM-C), Stormwater Management Model (SWMM-W), Espey unit hydrograph method (ESPEY - phi), South Florida Water Management District Modified SCS (SFWMD -B), and Snyder unit hydrograph method (SNYDER - Ct & Cp). Measured rainfall-runoff from 19 basins, 12 in Florida, 4 in Georgia, and 3 in Texas, with drainage areas less than 200 acres were used to generate optimized coefficients.

NTIS

Drainage; Hydrology; Water Management

19980016649 Geological Survey, Water Resources Div., Oklahoma City, OK USA

Water Resources Data for Oklahoma, Water Year 1995 Red, Volume 2, River Basin and Ground Water Wells *Annual Report, 1 Oct. 1994 - 30 Sep. 1995*

Blazs, R. L., Geological Survey, USA; Walters, D. M., Geological Survey, USA; Coffey, T. E., Geological Survey, USA; White, D. K., Geological Survey, USA; Boyle, D. L., Geological Survey, USA; May 1996; 265p; In English

Report No.(s): PB96-192042; USGS/WDR/OK-95/2; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

The report contains discharge records for 114 gaging stations; stage and contents for 9 lakes or reservoirs and 2 gage height stations; water quality for 47 gaging stations; 17 partial-record or miscellaneous streamflow stations and 28 ground-water sites. Also included are lists of discontinued surface-water discharge and water-quality sites.

NTIS

Oklahoma; Ground Water; Hydrology; Water Resources; Measuring Instruments

19980016677 National Park Service, Interagency Archeological Services, Denver, CO USA

Low Altitude Large Scale Reconnaissance: A Method of Obtaining High Resolution Vertical Photographs for Small Areas *Final Report*

Walker, J. W., National Park Service, USA; Devore, S. L., National Park Service, USA; 1995; 168p; In English

Report No.(s): PB96-143581; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

Low Altitude Large Scale Reconnaissance (LALSR) has grown from a marriage of engineering design, photo interpretation, radio controlled model aircraft, and photography. It has the capability of vertical high resolution recording of small areas for analysis. This volume is an attempt to pull all of these disciplines together in such a way as to make LALSR a useful tool to all who have the need for it.

NTIS

Aerial Photography; High Resolution; Low Altitude

19980016678 Geological Survey, Water Resources Div., Albuquerque, NM USA

Water Resources Data for New Mexico, Water Year 1994 *Annual Report, 1 Oct. 1993 - 30 Sep. 1994*

Borland, J. P., Geological Survey, USA; Ong, K., Geological Survey, USA; May 1995; 609p; In English

Report No.(s): PB96-143805; USGS/WRD/HD-94/292; USGS/WDR/NM-94/1; No Copyright; Avail: CASI; A99, Hardcopy; A06, Microfiche

Water-resources data for the 1994 water year for New Mexico consist of records of discharge and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality in wells and springs. This report con-

tains discharge records for 184 gaging stations; stage and contents for 26 lakes and reservoirs; water quality for 51 gaging stations and 72 wells; and water levels at 132 observation wells. Also included are 109 crest-stage partial-record stations. Additional water data were collected at various sites, not involved in the systematic data collection program, and are published as miscellaneous measurements.

NTIS

New Mexico; Ground Water; Hydrology; Waste Water

19980016680 Geological Survey, Water Resources Div., Tacoma, WA USA

Water Resources Data for Washington, Water Year 1994 Annual Report, 1 Oct. 1993 - 30 Sep. 1994

Wiggins, W. D., Geological Survey, USA; Ruppert, G. P., Geological Survey, USA; Smith, R. R., Geological Survey, USA; Reed, L. L., Geological Survey, USA; Hubbard, L. E., Geological Survey, USA; Jul. 1995; 504p; In English
Report No.(s): PB96-144076; USGS/WRD/HD-95/303; USGS/WDR/WA-94/1; No Copyright; Avail: CASI; A22, Hardcopy; A04, Microfiche

Water resources data for the 1994 water year for Washington consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels of wells. It includes: Water discharge for 226 gaging stations on streams, canals and drains; Stage only records for 4 sites; Discharge data for 87 partial-record or miscellaneous sites; Stage and (or) contents for 32 lakes and reservoirs; Water-quality data for 38 streams, canals, lakes and wells; and Water levels for 4 observation wells.

NTIS

Washington; Ground Water; Hydrology; Water Resources; Waste Water

19980016694 Geological Survey, Water Resources Div., Raleigh, NC USA

Water Resources Data for North Carolina, Water Year 1994, Volume 1, Surface-Water Records Annual Report, 1 Oct. 1993 - 30 Sep. 1994

Ragland, B. C., Geological Survey, USA; Smith, D. G., Geological Survey, USA; Barker, R. G., Geological Survey, USA; Rinehardt, J. F., Geological Survey, USA; Mar. 31, 1995; 600p; In English
Report No.(s): PB96-144118; USGS/WRD/HD-94/244; USGS/WDR/NC-94/1; No Copyright; Avail: CASI; A25, Hardcopy; A06, Microfiche

This report contains discharge records for 167 gaging stations and stage and contents for 56 lakes and reservoirs; water quality for 56 gaging stations and 32 miscellaneous sites; and continuous daily tide stage for 1 site. Additional water data were collected at 78 sites not involved in the systematic data-collection program and are published as miscellaneous measurements in this report.

NTIS

North Carolina; Hydrology; Ground Water

19980016697 Geological Survey, Water Resources Div., Towson, MD USA

Water Resources Data for Maryland and Delaware, Water Year 1994, Volume 1, Surface-Water Data Annual Report, 1 Oct. 1993 - 30 Sep. 1994

James, R. W., Geological Survey, USA; Simmons, R. H., Geological Survey, USA; Strain, B. F., Geological Survey, USA; May 1995; 445p; In English
Report No.(s): PB96-144084; USGS/WRD/HD-95/286; USGS/WDR/MD/DE-94/1; No Copyright; Avail: CASI; A19, Hardcopy; A04, Microfiche

This volume contains records for water discharge at 102 gaging stations; stage and contents 1 reservoir; and water quality at 55 gaging stations. Also included are data for 3 crest-stages and 6 tidal crest-stage partial-record stations. Additional water data were collected at various sites not involved in the systematic data-collection program and are published as miscellaneous measurements.

NTIS

Maryland; Delaware; Ground Water; Hydrology; Water Resources

19980016698 Geological Survey, Water Resources Div., San Juan, Puerto Rico

Water Resources Data for Puerto Rico and the U.S. Virgin Islands, Water Year 1994 Annual Report, 1 Oct. 1993 - 30 Sep. 1994

Diaz, P. L., Geological Survey, Puerto Rico; Aquino, Z., Geological Survey, Puerto Rico; Figueroa-Alamo, C., Geological Survey, Puerto Rico; Vachier, R. J., Geological Survey, Puerto Rico; Sanchez, A. V., Geological Survey, Puerto Rico; Apr. 1995; 536p; In English

Report No.(s): PB96-144100; USGS/WRD/HD-95/280; USGS/WDR/PR-94/1; No Copyright; Avail: CASI; A23, Hardcopy; A04, Microfiche

Water resources data for surface-water, quality-of-water, and ground-water records for the 1994 water year for Puerto Rico and the U.S. Virgin Islands consists of records of discharge, water quality of streams, and water levels of wells. This report contains discharge records for 76 streamflow-gaging stations; stage only for 5 gaging stations, daily sediments records for 22 streamflow stations; 94 partial-record or miscellaneous streamflow stations; stage records for 11 reservoirs; water-quality records for 16 streamflow-gaging stations, 42 ungaged streamsites, 11 lake sites, 2 lagoons, and 1 bay; and water-level records for 62 observation wells.

NTIS

Puerto Rico; Virgin Islands; Ground Water; Hydrology

19980016709 Forest Service, Intermountain Research Station, Ogden, UT USA

Smoothing Point Data into Maps Using SAS/GRAPH (Trade Name) Software Topical Report

Chojnacky, D. C., Forest Service, USA; Rubey, M. E., Forest Service, USA; Jan. 1996; 16p; In English; InterNational 20, 2-5 Apr. 1995, Orlando, FL, USA

Report No.(s): PB96-144035; FSRN/INT-428; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Point of plot data are commonly available for mapping forest landscapes. Because such data are sampled, mapping a complete coverage usually requires some type of interpolation between plots. SAS/GRAPH software includes the G3GRID procedure for interpolating or smoothing this type of data to map with G3D or GCONTOUR procedures. However, the smoothing process in G3GRID is not easily controlled, nor can it be used to display missing data within rectangular grid maps. These shortcomings motivated development of SAS code that prepares point data for display in mapping units. This code links well with the rest of the SAS system to allow for powerful, easily controlled data analysis within mapping units. Examples are given for mapping forest vegetation with the GMAP procedure.

NTIS

Geographic Information Systems; Forests; Wildlife; Mapping

19980016736 Geological Survey, Water Resources Div., Tacoma, WA USA

Water, Ice, and Meteorological Measurements at South Cascade Glacier, Washington: 1996 Balance Year

Krimmel, R. M., Geological Survey, USA; 1997; 45p; In English

Report No.(s): PB98-104821; USGS-WRI-97-4143; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Winter snow accumulation and summer snow, film, and icemelt were measured at South Cascade Glacier, Washington to determine the winter and net balances for the 1996 balance year. The 1996 winter balance, averaged over the glacier, was 2.94 meters, and the net balance was 0.10 meter. The net balance, which was positive for the first time since 1984, was more than a meter greater than the 1977-95 average net balance (-0.96 meter). The glacier retreated about 15 meters from its 1995 position. Runoff was measured from the glacier and an adjacent non-glacierized basin. Air temperature, precipitation, and barometric pressure were measured nearby. This report makes these data available to the glaciological and climatological community.

NTIS

Climatology; Glaciers; Ice; Snow

19980016745 Geological Survey, Water Resources Div., Mounds View, MN USA

Water Resources Data for Minnesota, Water Year 1995 Annual Report, 1 Oct. 1994 - 30 Sep. 1995

Mitton, G. B., Geological Survey, USA; Wakeman, E. S., Geological Survey, USA; Guttormson, K. G., Geological Survey, USA; May 30, 1996; 410p; In English

Report No.(s): PB96-191127; USGS/WRD/MN-95/1; No Copyright; Avail: CASI; A18, Hardcopy; A04, Microfiche

Water resources data for the 1995 water year for Minnesota consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality in wells and springs. This volume contains discharge records for 96 stream-gaging stations; stage and contents for 12 lakes and reservoirs; water quality for 23 stream-gaging stations; and water levels for 15 observation wells. Also included are 83 high-flow partial-record stations. Additional water data were collected at various sites that are not part of the systematic data collection program, and are published as miscellaneous measurements.

NTIS

Water Resources; Water Quality; Minnesota; Surface Water; Hydrology

19980016748 Geological Survey, Marlborough, MA USA

Hydrogeology and Water Quality of a Surficial Aquifer Underlying an Urban Area, Manchester, Connecticut

Mullaney, J. R., Geological Survey, USA; Grady, S. J., Geological Survey, USA; 1997; 56p; In English

Report No.(s): PB98-107287; USGS/WRI-97-4195; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report presents the results of a flowpath study in Manchester, Connecticut, to examine relations among hydrogeology, land-use patterns, and the presence of contaminants in the surficial aquifer system, and to evaluate ground water as a source of contamination to surface water. Information also is included on the hydrogeology of the surficial aquifer, spatial and temporal variations in chemical quality of ground water, direction and magnitude of ground-water flow, age of ground water, and the amount of water withdrawn from the surficial aquifer for public supply. A two-dimensional, steady-state, finite-difference ground-water-flow model was used to improve the understanding of the ground-water system in the Manchester area and to estimate the travel distances from source areas to sampled wells.

NTIS

Aquifers; Water Quality; Surface Water; Water Flow; Ground Water; Hydrogeology; Contamination; Water Pollution; Land Use

19980016756 Geological Survey, Water Resources Div., Baltimore, MD USA

Water Resources Data for Maryland and Delaware, Water Year 1996, Volume 2, Ground-Water Data Annual Report, 1 Oct. 1995 - 30 Sep. 1996

Smigaj, M. J., Geological Survey, USA; Saffer, R. W., Geological Survey, USA; Staroneck, R. J., Geological Survey, USA; Tegeler, J. L., Geological Survey, USA; Aug. 1997; 558p; In English

Report No.(s): PB97-207039; USGS/WDR/MD/DE-96/2-Vol-2; No Copyright; Avail: CASI; A24, Hardcopy; A04, Microfiche

This report contains water levels at 380 observation wells, discharge records for 5 springs and water quality at 196 wells.

NTIS

Water Resources; Water Quality; Delaware; Ground Water; Hydrology; Aquifers

19980016757 Fish and Wildlife Service, Washington, DC USA

Alaska Wetlands and Hydrography Final Report

Hall, J. V., Fish and Wildlife Service, USA; Keating, B., Bureau of Land Management, USA; Kratzer, S., Fish and Wildlife Service, USA; Jennings, T. W., Fish and Wildlife Service, USA; Nakazawa, L., Bureau of Land Management, USA; Dec. 1996; 44p; In English; Original contains color illustrations

Report No.(s): PB97-166367; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The report focuses on procedures used by the Fish and Wildlife Service (FWS) and the Bureau of Land Management (BLM) to employ Intelligence Community (IC) National Systems imagery for inventorying wetlands, documenting wetlands trends (losses and gains), and identifying boundaries of hydrographic features. Discussion includes the findings based on the analysis of National Systems data, and the feasibility of moving beyond the Pilot Study phase to the implementation of production work on the FWS National Wetlands Inventory and BLM land management activities. Additionally, the report identifies several areas of potential applications of National Systems data that could immediately benefit the missions of the FWS, BLM, and other federal agencies.

NTIS

Hydrography; Land Management; Wetlands; Wildlife; Satellite Imagery; Remote Sensing; Alaska; Imaging Techniques

19980016758 Geological Survey, Water Resources Div., Oklahoma City, OK USA

Water Resources Data for Oklahoma, Water Year 1995, Volume 1, Arkansas River Basin Annual Report, 1 Oct. 1994 - 30 Sep. 1995

Blazs, R. L., Geological Survey, USA; Walters, D. M., Geological Survey, USA; Coffey, T. E., Geological Survey, USA; White, D. K., Geological Survey, USA; Boyle, D. L., Geological Survey, USA; May 1996; 459p; In English

Report No.(s): PB96-192059; USGS/WDR/OK-95/1; No Copyright; Avail: CASI; A20, Hardcopy; A04, Microfiche

The report contains discharge records for 114 gaging stations; stage and contents for 9 lakes or reservoirs and 2 gage height stations; water quality for 47 gaging stations; 17 partial-record or miscellaneous streamflow stations and 28 ground-water sites. Also included are lists of discontinued surface-water discharge and water-quality sites.

NTIS

Oklahoma; Hydrology; Ground Water

19980016759 Geological Survey, Richmond, VA USA

Hydrogeology of, and Quality and Recharge Ages of Ground Water in, Prince William County, Virginia, 1990-91

Nelms, D. L., Geological Survey, USA; Brockman, A. R., Geological Survey, USA; 1997; 69p; In English
Report No.(s): PB97-171235; USGS/WRI-97-4009; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report presents a description of the hydrogeology, the ground-water quality, and the ages of ground-water recharge in Prince William County, Va. The hydrology of the county is discussed in terms of the hydrogeologic framework and ground-water-flow systems, and water-bearing potential of the consolidated rocks and unconsolidated materials. The statistical and spatial distribution of major properties and constituents, types of water, and recharge ages of ground water are discussed.

NTIS

Ground Water; Hydrogeology; Virginia; Water Flow; Water Quality; Flow Velocity; Recharging

19980016767 Environmental Protection Agency, Science Advisory Board, Washington, DC USA

Advisory on the Development of Phase 2 of the Index of Watershed Indicators

Sep. 30, 1997; 14p; In English

Report No.(s): PB98-104771; EPA-SAB-EPEC-ADV-97-003; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Ecological Processes and Effects Committee of the Science Advisory Board met to review and provide comments on the National Watershed Assessment Project (NWAP), recently renamed the Index of Watershed Indicators (IWI), being developed by the Office of Water. The purpose of IWI is to provide available data in a Geographic Information System (GIS) format to interested parties, including state and tribal governments and members of the public, for assessing the condition and vulnerability of watersheds. This letter contains the Committee's overall comments on IWI, as well as responses to the five specific questions contained in the Charge.

NTIS

Watersheds; Geographic Information Systems

19980016780 North Central Forest Experiment Station, Rhinelander, WI USA

Interpretation of Landscape Structure from Historic and Present Land Cover Data in the Eastern Upper Peninsula of Michigan

Silbernagel, J., North Central Forest Experiment Station, USA; Chen, J., North Central Forest Experiment Station, USA; Gale, M. R., North Central Forest Experiment Station, USA; Pregitzer, K. S., North Central Forest Experiment Station, USA; Jul. 31, 1997; 40p; In English; Original contains color illustrations

Report No.(s): PB98-105489; FSGTR-NC-192; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The objective of this report was: to compile quantitative information, or landscape metrics; to supplement existing qualitative descriptions of landtype associations in the study area; and to compare the distribution of landscape measures among landtype association groups in historic and present landscapes. This study occurred in the context of a larger research project whereby historic and contemporary landscape variability was described and quantified, landscape change was assessed over a 150-year time period, cultural settlement patterns were assessed over a 3,000-year time period, and the landscape change was discussed in terms of the combination of biophysical and cultural factors.

NTIS

Land Use; Ecosystems; Biophysics; Geomorphology; Resources Management; Pattern Recognition

19980016781 Geological Survey, Water Resources Div., Helena, MT USA

Water Resources of the Browning-Starr School Area, Blackfeet Indian Reservation, Northwestern Montana

Cannon, M. R., Geological Survey, USA; Sep. 1997; 52p; In English

Report No.(s): PB98-107279; USGS/WRI-97-4134; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The purpose of this report is to describe the water resources of the area between Browning and Starr School and to present data collected during a study of the water resources. The report contains a geologic map and describes geology and geomorphology in the Browning area, ground-water resources in the general area, and surface-water resources of Cut Bank Creek.

NTIS

Water Resources; Surface Water; Aquifers

19980016782 SWCA, Inc., Tucson, AZ USA

Colorado River Basin Study. Report to the Western Water Policy Review Advisory Commission Final Report

Pontius, D., SWCA, Inc., USA; Aug. 1997; 188p; In English

Report No.(s): PB98-110398; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

The Western Water Policy Review Advisory Commission (Commission) requested that this study include background information on the Colorado River and its geology, geography, and hydrology; a description and analysis of the most critical issues facing the basin in the near future and efforts being made to address these problems; and also provide specific recommendations to the Commission including the proper role for the federal government in basin water management and governance over the next twenty years. In addition, the report was to include a case study of a specific watershed and a discussion of how water management problems are and can be dealt with at the watershed level. The Dolores River Watershed, located in southwestern Colorado, was chosen for this case study.

NTIS

Water Resources; Water Management; Colorado River (North America); Hydrology; Policies; River Basins

19980016800 Geological Survey, Water Resources Div., Rolla, MO USA

Simulation of Ground-Water Flow and Contributing Recharge Areas in the Missouri River Alluvial Aquifer at Kansas City, Missouri and Kansas

Kelly, B. P., Geological Survey, USA; 1996; 110p; In English

Report No.(s): PB97-170252; USGS/WRI-96-4250; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The purpose of this report is to describe the development, calibration, and application of a ground-water flow model of the Missouri River alluvial aquifer in the Kansas City metropolitan area. In particular, the simulated results of five different scenarios of pumping rates and river stage that represent the range of conditions expected to occur are presented: (1) low pumping rates and low river stage, (2) low pumping rates and high river stage, (3) quasi-steady state conditions of January 1993, (4) high pumping rates and low river stage, and (5) high pumping rates and high river stage. The CRA for each public-water-supply well field and related ground-water travel times at various distances from each public-water-supply well field are presented for each of the five scenarios. Data indicating rates of ground-water pumpage from public-water-supply well fields and industrial water-supply wells located in the study area, daily rainfall amounts, and river stages for the Missouri, Kansas, Blue, and Little Blue Rivers also were collected.

NTIS

Aquifers; Ground Water; Hydrology Models; Missouri River (US); Water Flow; Wells; Computerized Simulation; Flow Velocity

19980016823 Geological Survey, Water Resources Div., Urbana, IL USA

Water Resources Data for Illinois, Water Year 1996, Volume 1, Illinois except Illinois River Basin Annual Report, 1 Oct. 1995 - 30 Sep. 1996

LaTour, J. K., Geological Survey, USA; Maurer, J. C., Geological Survey, USA; Wicker, T. L., Geological Survey, USA; May 1997; 270p; In English

Report No.(s): PB97-176226; USGS/WDR/IL-96/1; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

This volume contains: (1) discharge for 76 surface-water gaging stations and for 5 crest-stage partial-record stations; (2) stage for 4 surface-water gaging stations; (3) stage for 2 reservoirs; (4) water-quality records for 3 surface-water gaging stations; (5) sediment discharge records for 11 surface-water gaging stations; and (6) water-level records for 4 observation wells.

NTIS

Illinois; Surface Water; Water Quality; Water Resources; Ground Water; Geological Surveys; Data Acquisition

19980016833 Geological Survey, Reston, VA USA

Hydrology of the Southeastern Coastal Plain Aquifer System in South Carolina and Parts of Georgia and North Carolina: Regional Aquifer-System Analysis, Southeastern Coastal Plain

Aucott, W. R., Geological Survey, USA; 1997; 99p; In English

Report No.(s): PB97-186902; USGS-PP-1410-E; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

This report summarizes the finds of the RASA study of the ground-water flow system of the Coastal Plain aquifers of South Carolina and adjacent parts of Georgia and North Carolina. It includes a description of the geohydrologic framework, the predevelopment and 1982 ground-water flow systems, general water-quality characteristics, and the results of ground-water flow systems, general water-quality characteristics, and the results of ground-water flow simulations. Included in the report are maps showing distribution of transmissivity for the different aquifers based on field data and model calibrations, predevelopment potentiometric surfaces, and 1982 potentiometric surfaces. Also included are maps that show the results of the analysis of recharge and discharge relations for the various aquifers based on streamflow data and ground-water flow simulation.

NTIS

Aquifers; Ground Water; Hydrogeology; Water Flow; Water Quality; Coastal Plains

19980016834 Geological Survey, Water Resources Div., Carson City, NV USA

Hydrogeology and Potential for Ground-Water Development, Carbonate-Rock Aquifers, Southern Nevada and South-eastern California

Burbey, T. J., Geological Survey, USA; 1997; 77p; In English

Report No.(s): PB97-187173; USGS-WRI-95-4168; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The purpose of this report is: (1) to describe the geology and hydrology of the carbonate-rock aquifers in southern Nevada, and (2) to evaluate the potential for development of their water resources. The 17 areas were selected on the basis of the presence of thick sections of carbonate rock within the hydrographic area, the availability of geologic and hydrologic information needed to adequately evaluate the potential for development, and the accessibility to the area. The potential for development of each selected area was determined on the basis for depth to water, depth and thickness of carbonate rocks, and water quality. In addition, this report describes the geologic processes that have affected each of the selected areas and provides such information as the depth to, and the thickness and extent of, carbonate rocks beneath basin fill. The hydrologic framework of each area is described and pertinent data such as estimates of recharge and discharge, depth to water, water quality, and location of wells and springs tapping basin fill carbonate rocks are provided. Geologic controls that affect the location and movement of ground water are also described.

NTIS

Hydrogeology; Ground Water; Water Resources; Water Quality; Aquifers; Carbonates

19980016837 Forest Service, Intermountain Research Station, Ogden, UT USA

Botanical Reconnaissance of Carlton Ridge Research Natural Area: Mid- to High-Elevation Subalpine Habitats *Topical Report*

Stalling, C. M., Forest Service, USA; Jan. 1997; 9p; In English

Report No.(s): PB97-134357; FSRN/INT-431; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The Carlton Ridge Research Natural Area, located at the north end of the Bitterroot Mountains, displays many representative and unique qualities of subalpine forest types. As a research natural area, Carlton Ridge is protected for its biological diversity and for its research and educational opportunities. A complete plant inventory of the Carlton Ridge Research Natural Area was conducted to provide more detailed information.

NTIS

Surveys; Botany; Reconnaissance; Research and Development; Plants (Botany)

19980016852 Geological Survey, Water Resources Div., Pembroke, NH USA

Estimated Water Withdrawals and Use in New Hampshire, 1995

Medalie, L., Geological Survey, USA; 1997; 26p; In English

Report No.(s): PB98-110372; USGS/WRI-97-4177; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Selected data from the 1995 water-use compilation for New Hampshire are presented in this report. The purpose of this report is to provide estimates of water-withdrawal and -use data to water-resources professionals and the general public, to compare data among river basins and counties in New Hampshire, and to present a brief discussion about how the data were derived.

NTIS

Water Resources; River Basins; New Hampshire; Ground Water; Surface Water

19980016855 Geological Survey, Water Resources Div., Lemoyne, PA USA

Water Resources Data for Pennsylvania, Water Year 1994, Volume 2, Susquehanna and Potomac River Basins *Annual Report, 1 Oct. 1993 - 30 Sep. 1994*

Durlin, R. R., Geological Survey, USA; Schaffstall, W. P., Geological Survey, USA; Mar. 1996; 436p; In English

Report No.(s): PB96-192448; USGS/WDR/PA-94/2; No Copyright; Avail: CASI; A19, Hardcopy; A04, Microfiche

This volume, Volume 2, contains: (1) discharge records for 94 continuous-record streamflow-gaging stations and 39 partial-record stations; (2) elevation and contents records for 12 lakes and reservoirs; (3) water-quality records for 17 gaging stations and 125 partial-record and project stations; and (4) water-level records for 25 observation wells. Additional water data collected at various sites not involved in the systematic data-collection program are also presented.

NTIS

Pennsylvania; Water Resources; Water Quality; Surface Water; Ground Water; Hydrology

19980016878 Geological Survey, Pembroke, NH USA

Estimated Water Withdrawals and Use in Vermont, 1995

Medalie, L., Geological Survey, USA; 1997; 26p; In English

Report No.(s): PB98-110364; USGS/WRI-97-4178; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Selected data from the 1995 water-use compilation for Vermont are presented in this report. The purpose of this report is to provide estimates of water-withdrawal and use data to water-resources professionals and the general public, to compare data among river basins and counties in Vermont, and to present a brief discussion about how the data were derived.

NTIS

Water Resources; River Basins; Vermont; Ground Water; Surface Water

19980016893 National Biological Service, Environmental Management Technical Center, Onalaska, WI USA

Annual Work Plan, Fiscal Year 1996 for the Upper Mississippi River System. Long Term Resource Monitoring Program

Sep. 30, 1995; 141p; In English

Report No.(s): PB96-164629; LTRMP-95-P007; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Fiscal Year 1996 Annual Work Plans (AWP) emphasis is concentrated in the following areas: Initiate and complete a strategic planning effort to anticipate Program emphases over the next 3-5 years; Continue evaluations of Habitat Rehabilitation and Enhancement Projects (HREPs) and initiate HREP needs analysis; Increase linkages of navigation studies with LTRMP efforts; Continue emphasis on sedimentation and sediment transport processes; Fine-tune and review resource monitoring strategies; Increase integrative studies and analysis; Increase coordination of field office research activities with LTRMP priority needs; Continue to increase LTRMP report production; Continue to expand electronic access to LTRMP data, reports, and related publications; Through partnership development, increase emphasis on wildlife component data collection and analysis; and increase emphasis on sharing Program results and achievements with Partners and grassroots organizations.

NTIS

Navigation; Mississippi River (US); Aquatic Plants; Water Quality; Water Management

19980016894 Geological Survey, Water Resources Div., San Juan, Puerto Rico

Geohydrology and Simulation of Ground-Water Flow in the Salinas to Patillas Area, Puerto Rico. Caribbean Islands Regional Aquifer Systems Analysis

Quinones-Aponte, V., Geological Survey, Puerto Rico; Gomez-Gomez, F., Geological Survey, Puerto Rico; Renken, R. A., Geological Survey, Puerto Rico; 1996; 44p; In English

Report No.(s): PB96-164009; USGS/WRI-95-4063; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report describes the geohydrology of the Salinas to Patillas area of the South Coastal Plain aquifer system and documents the construction, calibration, and application of a three-layer digital ground-water-flow model. The geohydrology of the Salinas to Patillas area was described in terms of its physical and hydraulic characteristics. These characteristics included thickness, areal extent of the geohydrologic units, and areal variability of hydraulic conductivity values. The characteristics of the aquifer system were reevaluated with more recent data regarding the distribution of aquifer material and hydrologic boundaries.

NTIS

Puerto Rico; Aquifers; Hydrology Models; Ground Water; Water Flow

44

ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower. For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 28 Propellants and Fuels.

19980012507 NERAC, Inc., Tolland, CT USA

Mobile Fuel Cell Power Plants. (Latest citations from the Energy Science and Technology Database)

Jan. 1996; In English; Page count unavailable.

Report No.(s): PB96-858477; Copyright Waived; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)); US Sales Only, Microfiche

The bibliography contains citations concerning the technology and use of mobile fuel cell power plants. Topics include systems design considerations, current technology, and future developments. Alkaline, thulium, solid oxide, and electrolyte fuel cells are examples of mobile fuel cells discussed.

NTIS

Bibliographies; Fuel Cells; Technology Utilization; Design Analysis

19980013137 NERAC, Inc., Tolland, CT USA

Portable Fuel Cells. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English; Page count unavailable.

Report No.(s): PB96-858485; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the technology and uses of portable fuel cells. Topics include current technology and space and commercial uses. Fuel cell evaluation for military vehicles is discussed.

NTIS

Bibliographies; Fuel Cells; Technologies; Evaluation

19980013159 Syracuse Univ., Dept. of Chemical Engineering and Materials Science, NY USA

Hydrogen Storage on Activated Carbon *Final Report*

Schwarz, James A., Syracuse Univ., USA; Nov. 1994; 45p; In English

Report No.(s): PB96-195185; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Although hydrogen offers many advantages as a fuel, one disadvantage is in storage. Options include: high-pressure tanks that are heavy and bulky; the handling of a cryogenic liquid; or using heavy, expensive, and inefficient metal hydrides. This means that the amount of hydrogen that can be stored in a given space or within a given weight is small compared to conventional fuels. Storage on adsorbent carbon has shown promise, but thus far only at low temperatures, from 77 to 150 degrees Kelvin. The primary objective is to develop a process for preparing molecularly engineered carbons for useful quantities of hydrogen storage at low pressures and at acceptable temperatures. The ultimate goal is to produce a new class of hydrogen storage materials that offers a doubling or tripling of hydrogen storage capacity compared to the best previous results, i.e., materials capable of 20 to 30 percent storage on a weight basis.

NTIS

Fuel Cells; Activated Carbon; Hydrogen; Gas Pressure; Cryogenics; Adsorbents

19980014813 Texas A&M Univ., College Station, TX USA

High Performance PEM Fuel Cells: From Electrochemistry and Material Science to Engineering Development of a Multi-cell Stack *Interim Report*

Appleby, A. J., Texas A&M Univ., USA; Mar. 04, 1997; 7p; In English

Contract(s)/Grant(s): N00014-95-I-0114

Report No.(s): AD-A331373; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Under Task 1, it was shown that apparently identical MEAs of 50 sq cm active area with 1.4 mg/sq cm Pt./C cathodes (20 wt % Pt on C) and 0.3 mg/sq cm Pt/C anodes with 40 microns thickness Gore-Select(TM) PEM material did not give identical performance, except in the Tafel region. This indicates that their overall active surface areas at low current density were identical, and that performance suffered at high current density in the range of interest. In all cases, this is shown as a change in polarization slope in the linear region. The slope of the best of these cells was 0.25 ohms sq cm, and that of the worst was ca. 0.36 ohms sq cm. In consequence, the performance of the best cell at 0.7 V with humidified gases was 0.44 A/sq cm, and that of the worst was 0.3 A/sq cm. These are substantially less than 0.7 A/sq cm at 0.7 V, which has been achieved in 5 sq cm cells. This is the fuel cell performance level required to achieve the overall system' performance goals (i.e., 0.7 A/sq cm and 0.7 V on hydrogen and air at atmospheric pressure). The variable polarization slope gives the impression of an internal resistance component, but the internal resistance measured at high frequency is rather low, about 0.12 ohms sq cm. Thus, the differences in performance observed are either due to problems with the flow-field, or to dispersion in performance between individual MEAs, which otherwise contain identical components made by identical methods.

DTIC

Fuel Cells; Performance Tests; Electrochemistry

19980015391 Fremont County Association of Governments, Riverton, WY USA

Feasibility Study: Alfalfa Leaf Meal as a Value-Added Crop and Alfalfa Stems as Biomass Fuel *Final Report*

Gray, A., Fremont County Association of Governments, USA; Kaan, D., Fremont County Association of Governments, USA; May 28, 1996; 22p; In English

Report No.(s): PB97-105548; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The grantee recognizes the importance of alfalfa production to agricultural economics in the western USA. With this grant, it secured the assistance of experts at the University of Wyoming to explore alternative uses for and, thus, ways to add value to alfalfa. The study was prompted by periodic unstable demand and price fluctuations for hay. The agricultural infrastructure and expertise for producing alfalfa is well established in the Western U.S. Alfalfa is a well-adapted, environmentally friendly crop which avoids a large fertilizer subsidy by fixing atmospheric nitrogen into a form utilized for plant growth. Leaf-stem fractions were evaluated for forage quality, biofuel energy content, and co-product yield due to separation procedure. The feasibility of conducting alfalfa leaf-stem separations in both stationary and mobile plants was considered on the basis of three factors: (1) price received for each fraction, (2) cost of the hay to be processed, and (3) cost of processing the hay. Both stationary and mobile separation plants showed positive net income potentials. Alfalfa stem pellets could be marked at appreciably lower cost than equivalent wood pellets for use in wood stoves. The report recommends that sufficient quantities of high-quality alfalfa leaf meal be produced and tested for evaluation in dairy, beef, aquaculture, poultry, and swine rations.

NTIS

Alfalfa; Biomass; Agriculture

19980015611 Army Construction Engineering Research Lab., Champaign, IL USA

Fuel Cells for Military Applications: Preliminary Findings *Interim Report*

Binder, Michael J., Army Construction Engineering Research Lab., USA; Holcomb, Franklin H., Army Construction Engineering Research Lab., USA; Taylor, William R., Army Construction Engineering Research Lab., USA; Aug. 1997; 25p; In English
Report No.(s): AD-A330941; CERL-IR-97/122; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In fiscal years 1993 and 1994 (FY93 and FY94), the U.S. Congress appropriated funds to advance the use of phosphoric acid fuel cells (PAFC) at Department of Defense (DoD) Installations. The U.S. Army Construction Engineering Research Laboratories (USACERL) was tasked with managing the Fuel Cell Demonstration Program, including developing turnkey PAFC packages, devising site selection criteria, screening DoD candidate installation sites against the site selection criteria to identify specific sites where the PAFCs were to be installed, and monitoring the installation process and subsequent system performance. A total of 12,200-kW PAFC power plants were purchased with the FY93 appropriations and 18 additional similar units were purchased with the FY94 appropriations; 11 fuel cells have been installed to date. Monitoring continues for electrical generation efficiency, degree of thermal utilization, air emission characteristics; and overall system reliability. As of 23 November 1996, the 11 fuel cells installed in the FY93 program have been operating for a combined total of over 83,425 hours, have generated over 14,607 MWh of electricity and over 23,255 MBtus of thermal energy, and have achieved an adjusted fleet availability of 88 percent.

DTIC

Phosphoric Acid Fuel Cells; Military Technology; Thermal Emission; Thermal Energy

19980015925 NERAC, Inc., Tolland, CT USA

Heat Pumps: Industrial Applications. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English

Report No.(s): PB96-859525; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning design, development, and applications of heat pumps for industrial processes. Included are thermal energy exchanges based on air-to-air, ground-coupled, air-to-water, and water-to-water systems. Specific applications include industrial process heat, drying, district heating, and waste processing plants. Other Published Searches in this series cover heat pump technology and economics, and heat pumps for residential and commercial applications. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Heat Pumps

19980015929 Environment Canada, Solid Waste Management Div., Ottawa, Ontario Canada

National Incinerator Testing and Evaluation Program: The Environmental Characterization of Refuse-Derived Fuel (RDF) Combustion Technology, Mid-Connecticut Facility, Hartford, Connecticut *Final Report, Jun. 1987 - Mar. 1993*

Finklestein, A., Environment Canada, Canada; Klicius, R. D., Environment Canada, Canada; Dec. 1994; 153p; In English

Report No.(s): PB96-153432; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

The report gives results of an environmental characterization of Refuse-Derived Fuel (RDF) semi-suspension burning technology at a facility in Hartford, Connecticut, that represents state-of-the-art technology, including a spray dryer/fabric filter Flue-Gas Cleaning (FGC) system for each unit. Results were obtained for a variety of steam production rates, combustion conditions, flue gas temperatures, and acid gas removal efficiencies. All incoming wastes and residue streams were weighed, sampled, and analyzed. Key combustor and FGC system operating variables were monitored on a real time basis. A wide range of analyses for acid gases, trace organics, and heavy metals was carried out on gas emissions and all ash residue discharges.

NTIS

Incinerators; Power Plants; Pollution Control; Evaluation; Performance Tests; Air Pollution

19980016310 Tabors Caramanis and Associates, Inc., Cambridge, MA USA

Automatic Control of Thermal Electric Storage (Cool) under Real-Time Pricing Final Report

Daryanian, B., Tabors Caramanis and Associates, Inc., USA; Norford, L. K., Tabors Caramanis and Associates, Inc., USA; Tabors, R. D., Tabors Caramanis and Associates, Inc., USA; Aug. 1994; 106p; In English

Report No.(s): PB96-195151; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Real Time Pricing (RTP) is an innovative rate structure that is expected to encourage energy conservation and demand reduction, and as such, is a demand-side management (DSM) initiative. This project's objective was to design, demonstrate, and assess the use of RTP in combination with electric thermal storage (ETS) and cool energy storage in several commercial buildings in New York State.

NTIS

Energy Conservation; Energy Storage; Real Time Operation; Automatic Control

19980016744 Utah Univ., Dept. of Chemical and Fuels Engineering, Salt Lake City, UT USA

LiBr Crystallization Inhibition Annual Report, Jan. - Dec. 1995

Dirksen, J. A., Utah Univ., USA; Ring, T. A., Utah Univ., USA; Jan. 1996; 28p; In English

Contract(s)/Grant(s): GRI-5094-260-2895

Report No.(s): PB96-178538; GRI-96/0107; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Improving the heat- and mass-transfer rates of absorption heat pumps is a vital part of increasing their economic efficiency. One effective way of increasing these rates would be to increase the temperature differences between the absorbent and coolant in the absorber. This temperature difference is established by a single property, the solubility limit of LiBr in aqueous solution. An automated LiBr crystallization inhibition analysis system has been developed to quantify the contribution effects of various nucleation inhibitors on the crystallization kinetics of aqueous solutions of concentrated LiBr. Precise and accurate thermal measurements have been made establishing the temperature of nucleation and crystal growth while controlling temperature ramps from 1 to 60 C/hr over a broad temperature range of -20 to 200 C. The results of this analysis establishes the average crystallization temperature and yield for a given solution composition.

NTIS

Absorbers (Materials); Heat Transfer; Mass Transfer; Lithium Compounds; Bromine Compounds; Coolants; Crystallization; Heat Pumps; Nucleation; Inhibitors

19980016754 Dartmouth Coll., Hanover, NH USA

Investigation of Inhibitory Factors in Processors for Continuous Conversion of Cellulosic Biomass to Ethanol Final Report

Mar. 1996; 72p; In English

Report No.(s): PB96-190566; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

New York State is interested in production of alternative fuels such as ethanol to increase economic activity and energy diversity in the transportation sector, where NYS depends on oil for 99% of fuel needs. Biomass, abundant in New York State, could provide the feedstock for an ethanol industry. This project attempted to reduce the cost of ethanol production from biomass by optimizing selected process steps and focussing on the use of thermophilic bacteria and upflow solids-retaining bioreactors. The project examined continuous hydrolysis and fermentation of first pretreated hardwood, and later paper sludge, to develop hardware and analytical techniques.

NTIS

Ethyl Alcohol; Biomass Energy Production; Energy Technology

45
ENVIRONMENT POLLUTION

Includes atmospheric, noise, thermal, and water pollution.

19980012495 California Univ., Coll. of Engineering, Riverside, CA USA

University of California, Riverside Environmental Chamber Data Base for Evaluating Oxident Mechanisms: Indoor Chamber Experiments through 1993, Volume 2, Appendices

Carter, W. P. L., California Univ., USA; Luo, D., California Univ., USA; Malkina, I. L., California Univ., USA; Fitz, D., California Univ., USA; Jul. 1996; 148p; In English

Report No.(s): PB96-190681; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Volume 2 contains the three appendices. Appendix A contains printouts of spreadsheets containing summaries of the runs in the data base. Appendix B contains tabulations of the NO_x and GC calibration data, which are too lengthy to include in the main body of the report. Appendix C describes how to install the distributed data files and software on a computer and how to conduct initial model simulations of the runs using the SAPRC modeling software and the SAPRC-90 and Carbon Bond IV mechanisms. NTIS

Data Bases; Calibrating; Management Methods; Computer Systems Programs; Computer Graphics

19980012509 Technische Univ., Delft, Netherlands

Commissions for Environmental Impact Assessment: Their Contribution to the Effectiveness of Environmental Impact Assessment

Mostert, E., Technische Univ., Netherlands; Nov. 07, 1995; 333p; In English

Report No.(s): PB96-173018; Copyright Waived; Avail: CASI; A15, Hardcopy; A03, Microfiche

The thesis presents a theory on the feasibility of EIA Commissions and the way in which they can be modeled. The cases selected are the Dutch EIA Commission, the central Polish EIA Commission and the Hungarian Commission on Power Plants. Extensive literature research was conducted on these cases and a total of 79 persons, involved in EIA were interviewed. In addition to the three cases, a more limited literature study was conducted on the Canadian EIA panels. Sections discuss the questions what EIA is, what EIA Commissions are, what effective EIA is, how subjective EIA is and what complications this can give for the effectiveness EIA is, how subjective EIA is and what complications this can give for the effectiveness of EIA, what the potential contribution of EIA Commissions to the effectiveness of EIA is, and what role the decision-making culture plays in this. NTIS

Damage Assessment; Decision Making; Environmental Surveys

19980012511 Environmental Protection Agency, Chesapeake Bay Program, Annapolis, MD USA

Airsheds and Watersheds: The Role of Atmospheric Nitrogen Deposition. A Report of the Shared Resources Workshop

Hicks, B. B., Environmental Protection Agency, USA; Valigura, R. A., Environmental Protection Agency, USA; Kerchner, M., Environmental Protection Agency, USA; Oct. 1995; 41p; In English; Shared Resources Workshop, 11-12 Oct. 1995, Warrenton, VA, USA

Report No.(s): PB96-172226; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The report is the product of a workshop conducted at Airlie Conference Center, Warrenton, Virginia, in October 1995, where leading scientists and key policy and regulatory officials assembled to explore mechanisms by which air and water pollution control programs can work together to help protect coastal ecosystems. The focus of the workshop was on atmospheric nitrogen compounds, but many of the conclusions would apply equally well to other pollutants occurring in the air, such as toxic chemicals, trace metals, and persistent organic compounds. NTIS

Air Pollution; Nitrogen Compounds; Organic Compounds; Policies; Pollution Control; Water Pollution; Watersheds

19980012512 Environmental Protection Agency, Subsurface Protection and Remediation Div., Ada, OK USA

Adaptive Local Grid Refinement to Solve Nonlinear Transport Problems with Moving Fronts

Yeh, G.-T., Environmental Protection Agency, USA; Cheng, H.-P., Environmental Protection Agency, USA; Cheng, J.-R., Environmental Protection Agency, USA; Short, T. E., Pennsylvania State Univ., USA; Enfield, C., Pennsylvania State Univ., USA; Mar. 1996; 10p; In English

Report No.(s): PB96-169842; EPA/600/A-96/023; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Highly nonlinear advection-dispersion-reactive equations govern numerous transport phenomena in subsurface media. This paper presents the development and verification of a computational algorithm to approximate the highly nonlinear transport equa-

tions of multiphase flow and reactive chemical transport. The algorithm was developed based on the Lagrangian-Eulerian decoupling method with an adaptive ZOOMing and Peak/valley Capture (LEZOOMPC) scheme. It consisted of both backward and forward node tracking, rough element determination, peak/valley capturing, and adaptive local grid refinement. A second order implicit tracking was implemented to accurately and efficiently track all fictitious particles. The unique feature of the algorithm is the adaptive mechanism. Unlike other adaptive local grid refinement methods, the adaptive mechanism of LEZOOMPC was based on the almost 'true' error estimates. The accuracy and efficiency of the algorithm was verified with the Burger's equation for a variety of cases. The robustness of the algorithm to achieve convergent solutions was demonstrated for highly nonlinear multiphase flow and reactive contaminant transport problems.

NTIS

Advection; Algorithms; Approximation; Burger Equation; Computational Grids; Flow Equations; Lagrangian Function; Multiphase Flow; Nonlinear Equations; Nonlinearity; Reactivity

19980012518 Lawrence Livermore National Lab., Livermore, CA USA

Bibliographic Review on the Analytical Methods for the Determination of Radium in the Environment

Bandong, B. B., Lawrence Livermore National Lab., USA; Guthrie, E. B., Lawrence Livermore National Lab., USA; Kreek, S. A., Lawrence Livermore National Lab., USA; Marsh, K. V., Lawrence Livermore National Lab., USA; Bazan, J. M., Lawrence Livermore National Lab., USA; Mar. 1996; 140p; In English

Report No.(s): PB96-178496; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

An extensive review of the technical literature from 1960 to the present was conducted to evaluate various analytical methods for the quantitative assay of normally occurring radionuclides of radium, in particular Ra-226 and Ra-228, in different media. The methods identified in this study will provide more reliable data for the assessment of potential environmental effects due to radium in offshore oil and gas industry effluents. Requirements are met satisfactorily by methods selected for the laboratory testing phase of the current investigation: alpha spectrometry using solid state detectors, radon emanation or emanometry, PERALS for the assay of Ra-226, Beta-liquid scintillation counting for the measurement of Ra-228, and gamma spectrometry for the simultaneous determination of Ra-226 and Ra-228.

NTIS

Assaying; Bibliographies; Environment Effects; Offshore Energy Sources; Radioactive Isotopes; Radium; Radium 226; Radon; Scintillation

19980012524 Environmental Protection Agency, Office of Policy, Planning and Evaluation, Washington, DC USA

Inventory of US Greenhouse Gas Emissions and Sinks: 1990 - 1994

Nov. 1995; 191p; In English

Report No.(s): PB96-175997; EPA/230/R-96/006; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This document provides information on greenhouse gas sources and sinks, and estimates of emissions and removals for the USA for 1990-1994, as well as the methods used to calculate these estimates and the uncertainties associated with them. In order to fully comply with the IPCC Guidelines, the USA has provided a copy of the IPCC reporting tables in Annex G of this report. These tables include the data used to calculate emission estimates using the IPCC Guidelines.

NTIS

Greenhouse Effect; Exhaust Emission; Exhaust Gases

19980012528 Health Effects Inst., Cambridge, MA USA

Diesel Exhaust: A Critical Analysis of Emissions, Exposure, and Health Effects. A Special Report of the Institute's Diesel Working Group Topical Report

Apr. 1995; 299p

Report No.(s): PB96-174289; HEI/RR-4/95; No Copyright; Avail: CASI; A13, Hardcopy; A03, Microfiche

The Health Effects Institute's (HEI) Diesel Working Group recently completed an evaluation of the carcinogenic risks associated with exposure to diesel engine emission. Part 1 of this report, 'Critical Issues In Assessing the Carcinogenicity of Diesel Exhaust: A Synthesis of Current Knowledge,' by Kathleen M. Nauss and the HEI Diesel Working Group presents the consensus views of the Group. Part 2 contains four background papers that address emissions and exposure issues and five papers that consider biological responses.

NTIS

Biological Effects; Combustion Products; Diesel Engines; Exhaust Emission; Exhaust Gases; Physiological Responses

19980012537 Environmental Protection Agency, Research Triangle Park, NC USA

National Air Quality and Emissions Trends Report, 1994 Annual Report

Wayland, M., Environmental Protection Agency, USA; Freas, W., Environmental Protection Agency, USA; Fitz-Simons, T., Environmental Protection Agency, USA; Hemby, J., Environmental Protection Agency, USA; Mintz, D., Environmental Protection Agency, USA; Schmidt, M., Environmental Protection Agency, USA; Tanajian, H., Environmental Protection Agency, USA; Sansevero, C., Environmental Protection Agency, USA; Thompson, R., Environmental Protection Agency, USA; Nizich, S., Environmental Protection Agency, USA; Oct. 1995; 101p; In English

Report No.(s): PB96-192505; EPA/454/R-95/014; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The report presents National and regional trends in air quality from 1985 through 1994 for particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone and lead. Air quality trends are also presented for 90 metropolitan areas. Both National and regional trends in each of these pollutants are examined. National air quality trends are also presented for both the National Air Monitoring Sites (NAMS) and other site categories. In addition to ambient air quality, trends are also presented for annual nationwide emissions. InterNational comparisons of air quality and emissions are contained in the report. The topics of air toxics and visibility are also addressed. The report also includes a section call Selected Metropolitan Area Trends. Air quality statistics are presented for each of the pollutants for all Metropolitan Statistical Areas with data in 1994.

NTIS

Environmental Monitoring; Air Quality; Contaminants; Nitrogen Dioxide; Sulfur Dioxides; Ozone; Trends

19980012540 Secretariat d'Etat a la Recherche, Algiers, Algeria

Recovery of iron metal from waste water by aluminosilicates

Nibou, Djamel, Secretariat d'Etat a la Recherche, Algeria; Amedjkouh, Abdelwaheb, Secretariat d'Etat a la Recherche, Algeria; Lebaili, Soltane, Universite des Sciences et de la Technologie Houari Boumediene, Algeria; Apr. 1997; 8p; In French

Report No.(s): INIS-DZ-0006; DE97-632305; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

The present work deals with the recovery of iron metal by ion exchange in using some aluminosilicates as NaY and NaX of different Si/AL rations, NaZSM-5 zeolites. These materials were synthesized by hydrothermal processes using amorphous gels of silicium, alumina and alkali solution in water presence. The product samples were characterized by X ray diffraction and observed and analysed by scanning electronic microscopy method. The obtained results show that aluminosilicates seen to be very effective in iron recovery. The fixation rate was varied from 1 to 55% and the texture of these materials was also studied by X ray diffraction. It seems that the aluminosilicates structures still intact after ion exchange processes.

DOE

Materials Recovery; Aluminum Silicates; Ion Exchanging; Iron

19980012543 NERAC, Inc., Tolland, CT USA

Oil Pollution Sampling, Detection, and Analysis. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English

Report No.(s): PB96-859962; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the monitoring and analysis of pollution resulting from oil production and transport operations. Citations discuss pollution monitoring methods and devices, tracing and analytical techniques, remote sensing, and oil-laden sediment sampling. Marine pollution assessment and control, offshore oil industry discharges, pollution effects on wildlife, and interNational cooperation on pollution control are also examined. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Oil Pollution; Pollution Monitoring; Pollution Control

19980012550 NERAC, Inc., Tolland, CT USA

Incineration: Air Pollution Emission. (Latest citations from Pollution Abstracts)

Jan. 1996; In English

Report No.(s): PB96-859319; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning gaseous and particulate emissions from waste incinerators. Topics include monitoring, analysis, and control of emissions. Dioxins, polychlorinated biphenyls, heavy metals, and radionuclides are examined. Sources of wastes include municipal solid wastes, hazardous materials, and medical wastes. Citations also address reg-

ulations and legislation regarding incinerators and their emissions. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Incinerators; Exhaust Emission

19980012561 Geological Survey, Water Resources Div., Denver, CO USA

Metal Speciation in the Upper Arkansas River, Colorado, 1990-93 Final Report

Clark, M. L., Geological Survey, USA; Lewis, M. E., Geological Survey, USA; 1997; 32p; In English

Report No.(s): PB97-168405; USGS/WRI-96-4282; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report describes the spatial and temporal distributions of dissolved-metal species on the basis of the results of chemical-speciating modeling. This information is used to assess the effect of streamflow regime on dissolved-metal speciation in the upper Arkansas River. Water-quality data collected from April 1990 through March 1993 at eight main-stem Arkansas River sites were used in the analyses.

NTIS

Rivers; Water Quality; Metals; Chemical Analysis; Particulate Sampling; Geological Surveys

19980012562 Research Inst. of National Defence, Umea, Sweden

Study of the Influence of Topography and Density on the Dispersion in a Gas Cloud with Application to a Traffic Accident with Release of Sulphur Dioxide Topical Report Studie av den Paverkan Topografi och Densitet har pa Dispersionen i ett Gasmoln

Burman, J., Research Inst. of National Defence, Sweden; Feb. 1997; 33p; In English

Report No.(s): PB97-165815; FOA-R-96-00304-4.5-SE; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this study, we are investigating the necessity of considering effect from topography as well as density gradients within the plume on dispersion of toxic gases, when calculating the field of concentration. The report is divided into two parts. The first is concerning the development and verification of an extended heavy gas turbulence model. The second part concerns dispersion of neutral and heavy gas in real terrain. The model is used to illustrate a hypothetical accident with release of SO. A verification study has been made and the result is presented in chapter 3 while the result from the simulation of an accidental release in Sundsvall is presented in Chapter 4.

NTIS

Plumes; Atmospheric Diffusion; Topography; Density (Mass/Volume); Gases; Cloud Physics; Terrain; Sulfur Dioxides; Hazardous Materials; Spilling; Experimentation

19980012617 National Marine Fisheries Service, Auke Bay, AK USA

Recovery of Sediments in the Lower Intertidal and Subtidal Environment. Restoration Project 93047-1. EXXON VALDEZ Oil Spill Restoration Project Final Report

O'Clair, C. E., National Marine Fisheries Service, USA; Short, J. W., National Marine Fisheries Service, USA; Rice, S. D., National Marine Fisheries Service, USA; May 1996; 36p; In English

Report No.(s): PB96-194832; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Sediments were collected at ten locations in Prince William Sound in July 1993 to determine the geographical and bathymetric distribution of oil from the Exxon Valdez oil spill in the low intertidal zone and subtidal region. The authors sampled sediments at mean lower low water (0 m) and at five subtidal depths from 3 to 100 m. No Exxon Valdez oil was found in sediments at 0 m where the greatest mean intertidal concentration of total polynuclear aromatic hydrocarbons excluding perylene (54 ng/g) was observed at Moose Lips Bay. Subtidal sediments showed polynuclear aromatic hydrocarbon composition patterns similar to Exxon Valdez oil at three sites, Herring Bay, Northwest Bay and Sleepy Bay. Contamination of sediments by Exxon Valdez oil reached a depth of 20 m at Northwest Bay and Sleepy Bay. In deep sediments (greater than or equal to 40 m) the authors found no evidence of weathered Exxon Valdez oil.

NTIS

Oil Slicks; Contamination; Water Pollution; Sediments; Prince William Sound (AK)

19980012761 NERAC, Inc., Tolland, CT USA

High Performance Liquid Chromatography (HPLC): Water and Environmental Samples. (Latest citations from the Ei Compendex*Plus database)

Jan. 1996; In English; Page count unavailable.

Report No.(s): PB96-859061; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning analyses of water by high pressure, high speed, high performance liquid chromatographic (HPLC). Environmental-related samples such as wastewaters, sewage sludge, and sediment are also covered. HPLC techniques are discussed and equipment such as detectors and columns is evaluated. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Liquid Chromatography; Bibliographies

19980012767 Army Cold Regions Research and Engineering Lab., Hanover, NH USA

Decontaminating Groundwater Sampling Devices

Parker, Louise V., Army Cold Regions Research and Engineering Lab., USA; Ranney, Thomas A., Army Cold Regions Research and Engineering Lab., USA; Oct. 1997; 26p; In English

Report No.(s): AD-A332657; CRREL-SR-97-25; SFIM-AEC-ET-CR-97021; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

These studies are the second part of a two-year project that examines decontaminating groundwater sampling devices. In the first year, the efficiency of various decontamination protocols was tested using small test pieces of materials that are commonly used in groundwater sampling devices. Those tests showed that a hot detergent wash and rinse followed by hot air drying (1050C) was the most effective decontamination protocol. In these studies, two groundwater sampling devices, a bailer and a bladder pump, were used to sample groundwater that was contaminated with either trichloroethylene (TCE), munitions, or pesticides. These studies showed that a hot detergent wash and hot water rinse followed by hot air drying is an effective method for decontaminating these sampling devices.

DTIC

Ground Water; Pesticides; Samplers; Trichloroethylene; Contamination; Decontamination

19980013145 NERAC, Inc., Tolland, CT USA

Gas Scrubbers Used on Pollution Control. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English

Report No.(s): PB96-859954; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning federally-funded research on processes and equipment used in the removal of SO₂, NO(x), CO, CO₂, organic compounds, and particulates. Design, performance, chemistry, and some of the gas flow characteristics for both stationary and mobile sources are included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Pollution Control; Scrubbers; Air Pollution

19980013148 Delft Hydraulics Lab., Netherlands

Monitoring Water Quality in the Future *Executive Summary*

Villars, M. T., Delft Hydraulics Lab., Netherlands; May 1995; 38p; In English

Report No.(s): PB96-174115; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The quality of water comprises many physical, chemical and biological aspects. On a global scale, biological pollution, i.e. microbial water pollution, poses the greatest problem. In most industrialized countries where hygienic conditions are better, it is chemical pollution that now causes most concern. There are about 100,000 chemicals listed on the European Inventory of Commercial Chemical Substances (EINECS). Two approaches are used to control the discharge of these chemicals to water. For most chemicals, an emission-oriented approach is applied to prevent unnecessary pollution. This approach is successful in preventing point-source pollution but cannot always be applied in cases of diffuse pollution. The second, or water quality approach, is based on meeting established water quality standards of objectives. This approach implies that the risk of not managing important chemicals is high. It is also the main reason why environmental quality standards are available for only a few chemicals. Monitoring is an important risk management tool to detect, control or to predict the human health or ecological effects of single chemicals or mixtures of chemicals.

NTIS

Biological Effects; Chemical Effects; Environmental Quality; Global Air Pollution; Water Pollution; Water Quality

19980013149 Radian Corp., Research Triangle Park, NC USA

Guidance for Total Organics Final Report

Martz, R. F., Radian Corp., USA; Mar. 1996; 222p; In English

Report No.(s): PB96-175120; EPA/600/R; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

This document provides to those wishing to determine the total organics content of source samples. Writers of air quality permit applications for waste combustion units require total organics data for their assessments. This document identifies specific techniques to determine the total organics sampled from stationary sources. The document seeks to avoid the confusion about organics measurement and eliminate the misleading and non-descriptive titles often given to different facets of organics analysis. It also provides information about combining the component parts of the organics analysis results into a helpful description of the data. Knowing the amount of previously uncharacterized organic material enables more accurate risk assessment estimates to be made. Discussions of the specific methods and operating procedures are found in the appendices and references.

NTIS

Organic Compounds; Pollution Monitoring; Waste Disposal; Solid Wastes

19980013158 Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC USA

Supplement A to Compilation of Air Pollutant Emission Factors, Volume 1, Stationary Point and Area Sources. Fifth Edition

Feb. 1996; 331p; In English

Report No.(s): PB96-192497; AP-42-ED-5-SUP-A; No Copyright; Avail: CASI; A15, Hardcopy; A03, Microfiche

This Supplement to AP-42 addresses pollutant-generating activity from Bituminous and Subbituminous Coal Combustion; Anthracite Coal Combustion; Fuel Oil Combustion; Natural Gas Combustion; Wood Waste Combustion in Boilers; Lignite Combustion; Waste Oil Combustion; Stationary Gas Turbines for Electricity Generation; Heavy-duty Natural Gas-fired Pipeline Compressor Engines; Large Stationary Diesel and all Stationary Dual-fuel engines; Natural Gas Processing; Organic Liquid Storage Tanks; Meat Smokehouses; Meat Rendering Plants; Canned Fruits and Vegetables; Dehydrated Fruits and Vegetables; Pickles, Sauces and Salad Dressing; Grain Elevators and Processes; Cereal Breakfast Foods; Pasta Manufacturing; Vegetable Oil Processing; Wines and Brandy; Coffee Roasting; Charcoal; Coal Cleaning; Frit Manufacturing; Sand and Gravel Processing; Diatomite Processing; Talc Processing; Vermiculite Processing; paved Roads; and Unpaved Roads. Also included is information on Generalized Particle Size Distributions.

NTIS

Air Pollution; Exhaust Emission; Size Distribution; Coal; Natural Gas; Combustion; Boilers; Fuel Oils

19980013940 Illinois State Environmental Protection Agency, Div. of Land Pollution Control, Springfield, IL USA

Toxic Packaging Reduction Report

Dec. 1996; 20p; In English

Report No.(s): PB97-135073; IEPA/BOL-97/001; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

State statute requires the Agency to evaluate the toxic packaging reduction program and inform the governor and the General Assembly of its effectiveness. This report also describes substitutes used in lieu of these toxic metals and outlines recommendations for continuing the exemption program.

NTIS

Toxicity; Packaging; Metals; Regulations; Law (Jurisprudence)

19980013941 Energy and Environmental Research Corp., Irvine, CA USA

Development of Toxics Emission Factors from Source Test Data Collected under the Air Toxics Hot Spots Program, Volume 2 Final Report

Apr. 11, 1996; 187p; In English

Report No.(s): PB97-135156; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

Air toxic emission factors were developed from source test data collected under the Air Toxics 'Hot Spots' Information and Assessment Act of 1987. Emission factors were calculated, from a selection of 200 priority tests, for trace metals including hexavalent chromium, PCDD/PCDF, PAH and other SVOC, benzene, toluene and other VOC, aldehydes, and HCl. The emission factor calculation procedures included categorizing each test by design and operating parameters. Statistics were applied to determine which parameters had a primary impact on emissions. These primary parameters were used to identify distinct groups of devices.

Several quality ratings were assigned to each emission factor including the confidence interval, relative standard deviation, population rating, and source test method rating.

NTIS

Air Pollution; Toxicity; Hydrochloric Acid; Benzene; Toluene; Metals

19980013943 National Inst. for Occupational Safety and Health, Cincinnati, OH USA

Health Hazard Evaluation Report HETA 95-0200-2579, Jim Dixon Lincoln-Mercury, Inc., Fairfield, Ohio

Echt, A. S., National Inst. for Occupational Safety and Health, USA; Hayden, C. S., National Inst. for Occupational Safety and Health, USA; May 1996; 25p

Report No.(s): PB97-136865; HETA-95-0200-2579; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In response to a request from three employees of Jim Dixon Lincoln-Mercury, Inc. (SIC-5511), Fairfield, Ohio, an investigation was made into possible hazardous working conditions at that site. Employees voiced concern about exposure to automobile undercoating, carbon-monoxide (630080) from car exhaust, and fumes from a kerosene (8008206) fired steam cleaner. They reported symptoms of headaches, nausea, vomiting, and dizziness. Undercoating was performed in an area on site which is enclosed on three sides by curtains in the service bay area. The fourth side of the enclosure was a wall of the shop. Air sampling was performed during the undercoating of a small car. The authors conclude that exposures to the components did not exceed applicable exposure criteria. However, some deficiencies were noted in the supplied air respirator which should be corrected. Air sampling for carbon-monoxide indicated that the steam cleaner was a source of the gas and should only be used with the doors to the garage open or when exhaust can be vented directly outside. The tail pipe exhaust ventilation system may have also been a source of carbon-monoxide. Temporary modifications were installed to the tail pipe exhaust ventilation system to remove exhaust gases from the service area.

NTIS

Air Sampling; Exhaust Gases; Carbon Monoxide; Fumes; Health; Physiological Effects; Ventilation; Exhaust Emission; Hazards

19980013944 National Inst. for Occupational Safety and Health, Cincinnati, OH USA

Health Hazard Evaluation Report HETA 94-0122-2578, Bath Iron Works Corporation, Bath, Maine

Sylvain, D. C., National Inst. for Occupational Safety and Health, USA; May 1996; 25p; In English

Report No.(s): PB97-136873; HETA-94-0122-2578; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In response to a request from the Bath Iron Workers Corporation (SIC-3731), Bath, Maine, the accuracy of personal air monitoring during abrasive blasting in confined spaces was evaluated. The facility was a large shipyard on the coast of Maine employing about 9,000 workers. Operations at the site were primarily involved with construction of US Navy destroyers. Blasters wore personal protective equipment including gloves, boots, coveralls, and a continuous flow supplied air blast hood. Personal breathing zone samples were collected using a standard closed face cassette, a closed face cassette with a metal guard, and a nylon cyclone. The NIOSH sampling and analytical methods did not accurately represent worker exposure to lead (7439921) and other elements during abrasion. The methods were inaccurate due to the abrasive blasting grit which entered the cassette inlet due to its high velocity, rather than being collected on the filter as an airborne containment in an air sample of known volume.

NTIS

Hazards; Iron; Health; Environmental Monitoring; Air Quality; Containment

19980014085 Texas A&M Univ., Texas Transportation Inst., College Station, TX USA

Houston Employee Commute Options Program: An Analysis of Options and Their Potential Energy and Emissions Benefits Topical Report, Sep. 1994 - Aug. 1996

Crawford, J. A., Texas A&M Univ., USA; Hall, K. M., Texas A&M Univ., USA; Rao, K. S., Texas A&M Univ., USA; Jul. 1996; 163p; In English

Report No.(s): PB97-105035; SWUTC-96-465090-1; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

A specific program of the 1990 Clean Air Act Amendments is the Employer Trip Reduction Program (ETR), which is sometimes recognized as the Employee Commute Options (ECO) program. In Cooperation with the Texas Natural Resource Conservation Commission (THRCC), a data base of submitted and approved ETR plans and worksite registration forms were developed. The database represents approximately 1,200 worksites that accounts for 396,488 employees in the eight-county nonattainment area that arrive to the worksite between 6:00 a.m. and 10:00 a.m.. The purpose of this study was to evaluate the potential impact of the ETR program on Houston's mobile source emissions and fuel consumption. A secondary objective was to evaluate the characteristics of the ETR program through plans submitted by affected worksites. The ETR database was used to evaluate the potential effectiveness of the ETR program throughout the eight-county nonattainment area had it achieved 100 percent compliance and met the target average passenger occupancies set in the plan. to supplement this analysis, a survey was conducted to determine

the indirect trip rates caused as result of participation in the ETR program. The database was also used for an initial examination into the preferences of employees and employers in choosing specific transportation control measures. Recommendations for future research, based on the finding from this study, are also presented in this report.

NTIS

Air Quality; Fuel Consumption; Potential Energy; Resources Management; Transportation

19980014088 Texas A&M Univ., Texas Transportation Inst., College Station, TX USA

Using Acceleration Characteristics in Air Quality and Energy Consumption Analyses

Eisele, W. L., Texas A&M Univ., USA; Turner, S. M., Texas A&M Univ., USA; Benz, R. J., Texas A&M Univ., USA; Aug. 1996; 86p; In English

Report No.(s): PB97-105001; SWUTC-96-465100-1; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This research investigated the effects of detailed speed and acceleration characteristics on energy consumption utilizing several fuel consumption models. The relationships between speed and acceleration characteristics, geometric characteristics (e.g., number of lanes, signal density, driveway density), and traffic flow variability for various roadways were also investigated. Finally, distributions were produced that summarize the operating characteristics of freeway and arterial streets in Houston, Texas using an electronic distance-measuring instrument (DMI) and the floating car technique.

NTIS

Air Quality; Fuel Consumption; Highways; Acceleration; Energy Consumption; Traffic

19980014206 Naval Research Lab., Washington, DC USA

An Investigation of Air Emission Reduction Methods for Aircraft Rescue and Firefighter Training Fires: Small-Scale Tests Final Report, 1996-1997

Peatross, M. J., Hughes Associates, Inc., USA; Ouellette, R. J., Hughes Associates, Inc., USA; Verdonik, D. P., Hughes Associates, Inc., USA; Williams, F. W., Hughes Associates, Inc., USA; Nov. 20, 1997; 47p; In English

Report No.(s): AD-A331811; NRL/MR/6180--97-8107; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Small-scale experiments were conducted to examine pollutant reduction techniques for JP-5 spray fires. These tests were part of a program to relocate the fire training facility at Naval Air Training Center (NATTC) Millington to NATTC Pensacola. The use of water spray, fuel additives, and water emulsion was investigated. Water spray was identified as the most feasible technique for immediate use at the facility. The water spray system was optimized by examining nozzle spray characteristics, nozzle configurations, and water-to-fuel ratios. A smoke reduction of 96 percent was achieved for a water-to-fuel ration of 9.1. Emissions factors for carbon monoxide, sulfur dioxide, nitric oxides, and total hydrocarbons were developed. These factors provide a better estimation of fire trainer emissions than those currently available.

DTIC

Fire Fighting; Rescue Operations; Training Devices; Emission

19980014438 Texas A&M Univ., Texas Transportation Inst., College Station, TX USA

Evaluation and Monitoring of Transportation Control Measures Final Report, Sep. 1991 - Sep. 1995

Knapp, K. K., Texas A&M Univ., USA; Rao, K. S., Texas A&M Univ., USA; Crawford, J. A., Texas A&M Univ., USA; Krammes, R. A., Texas A&M Univ., USA; Sep. 1995; 73p; In English

Report No.(s): PB97-103709; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The mandates of the Clean Air Act Amendments (CAAAAs) and Intermodal Surface Transportation Efficiency Act (ISTEA) Congestion Mitigation and Air Quality (CMAQ) Improvement Program require the evaluation and monitoring of transportation control measure (TCM) emission impacts. The objective of the research documented herein was to investigate issues related to the evaluation and monitoring of TCM impacts. Researchers reviewed the advantages and limitations of TCM evaluation methods currently available, and identified two critical issues which influence their capabilities and accuracy. The TCM evaluation methods reviewed include the use of comparative empirical data, network-based models, and sketch-planning tools. The structure of TCM monitoring programs was also studied. Monitoring programs are presented for four TCMs: transit plazas, intersection improvements, ridesharing, and park-and-ride lots.

NTIS

Air Pollution; Air Quality; Transportation; Congestion

19980014538 Argonne National Lab., IL USA

Reactive Hydrocarbon Analyzer: Based upon Ozone Chemiluminescence (Revised) Final Report, Nov. 1995 - Jul. 1996

Gaffney, J. S., Argonne National Lab., USA; Marley, N. A., Argonne National Lab., USA; Jul. 1996; 73p; In English

Report No.(s): PB97-108153; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report details the approach taken and the data gathered to date on the potential use of the temperature dependence of ozone chemiluminescence for monitoring hydrocarbon reactivities as a means of filling the gap in current methodologies. The first year of this project involved the design and construction of a prototype ozone chemiluminescent detection system which was temperature controlled. Preliminary results using the ozone chemiluminescent hydrocarbon detector indicated that this approach might lead to a hydrocarbon measurement technique that would act an intermediate approach between flame ionization detection and GC/MS methods. Attention was given in the second year to studying the response of the ozone detection system response at 170 C to determine if it correlated with the response from a conventional flame ionization detector. Twenty-seven compounds were studied representing alkanes, alkenes, aromatics, and oxygenated hydrocarbons (aldehydes, ketones, alcohols, and ethers). This report combines the results of this second year along with the initial developmental work. Results of the comparison of the detectors along with the preliminary pre-reactor work indicate that using the temperature dependence of ozone chemiluminescent reactions has potential for qualitative determination of reactive hydrocarbon emissions in real-time that could be useful in automotive exhaust gas monitoring.

NTIS

Hydrocarbons; Chemiluminescence; Air Pollution; Ozone; Reaction Kinetics; Reactivity

19980014539 California Univ., Statewide Air Pollution Research Center, Riverside, CA USA

Crop Losses from Air Pollutants: A Computer and Field-Based Assessment Program and Crop and Forest Losses from Air Pollutants: An Assessment Program Final Report

Mutters, R., California Univ., USA; Guzy, M., California Univ., USA; Thompson, C. R., California Univ., USA; Oct. 1993; 186p; In English

Report No.(s): PB97-106348; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

The Air Resources Board-sponsored Crop Loss Assessment Program quantifies potential ozone-caused yield losses in 26 crops grown in California. Statewide yield loss estimates were made with aggregated county statistics, and at a subcounty level for the southern San Joaquin Valley. Interpolations of statewide 7-hr mean zone levels were made for selected air basins delimited by a 2000-ft altitudinal barrier. Estimated yield losses were calculated using 2.50 pphm as a background 12-hr average concentration. Regression analyses were performed in a detailed analysis of cotton yield responses in Kern County. Statistically significant regressions of yield vs. ozone concentration, soil characteristics and cotton variety were observed. A field survey to identify ozone injury in cotton, almond and grape was conducted at 11 sites in the Central Valley.

NTIS

Air Pollution; Farm Crops; Ozone; Cotton; San Joaquin Valley (CA); Losses

19980014540 California Univ., Dept. of Civil and Environmental Engineering, Berkeley, CA USA

Impact of Improved Emissions Characterization for Nitrogen-Containing Air Pollutants for the South Coast Air Basin Final Report

Harley, R. A., California Univ., USA; May 1996; 71p; In English

Report No.(s): PB97-106314; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The objectives of this research are to: (1) study the sensitivity of predicted air pollutant concentrations to changes in the direct emission rates of NO₂ and HONO; and (2) compare predicted and observed concentrations of nitrogen-containing air pollutants for the August 27-29, 1987 intensive monitoring period from the Southern California Air Quality Study (SCAQS).

NTIS

Air Pollution; Air Quality; Nitrogen; Ammonia; Nitrogen Oxides

19980014800 Bureau of Reclamation, Dakota Area Office, Bismarck, ND USA

Arrowwood National Wildlife Refuge: Draft Environmental Impact Statement

Mar. 1996; 179p; In English

Report No.(s): PB96-165477; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This Draft Environmental Impact Statement (DEIS) analyzes the need to provide Arrowhead National Wildlife Refuge with water management capacity to mitigate for past restriction on water management capacity imposed by Jamestown Reservoir. This DEIS presents an incremental series of actions that could provide varying levels of this capacity. The preferred alternative is the Mud and Jim Lakes Bypass-Lower JUP Alternative.

NTIS

Water Management; Environment Effects; Aquatic Plants; Rivers

19980015092 Texas Univ., Center for Transportation Research, Austin, TX USA

Promoting the Sustainable Community: The Application of Geographic Information Systems in Ridesharing *Topical Report*

Han, G. C., Texas Univ., USA; Walton, C. M., Texas Univ., USA; Aug. 1996; 97p; In English

Report No.(s): PB97-104905; SWUTC-96-467303-1; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

Previously required mandates demanded that organizations employing over 100 employees survey their work sites to obtain information on commuter node usage, develop plans to reduce vehicle occupancy (usually in the form of transportation demand management (TDM) techniques) to meet regional target occupancy rates, and maintain those occupancy rates the employer would be penalized financially and/or criminally. The specific problem that this study addresses is the problem of forecasting rideshare demand for the work trip to an employment site. A major employer in the Austin area of Travis County has expressed interest in developing ridesharing systems to curb demand for parking and is used as a case scenario for the application to innovative demand forecasting techniques.

NTIS

Geographic Information Systems; Transportation; Travel; Organizations; Traffic

19980015093 Texas Univ., Texas Transportation Inst., Arlington, TX USA

Energy and Air Quality Benefits of Freeway Bottleneck Improvements *Final Report, Jan. 1993 - Aug. 1996*

Walters, C. H., Texas Univ., USA; Middleton, M. D., Texas Univ., USA; Willes, P. B., Texas Univ., USA; Aug. 1996; 53p; In English

Report No.(s): PB97-104897; SWUTC-96-60039-1; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This research investigated the relationships between traffic operating characteristics and environmental factors such as fuel consumption, hydrocarbon emissions, carbon monoxide emissions, and nitrogen oxide emissions. A methodology was developed to analyze existing before and after data from traffic improvements projects that have been implemented. The change in fuel consumption was quantified and guidelines were developed to help predict energy benefits from implementing future freeway bottleneck improvements.

NTIS

Air Quality; Traffic; Fuel Consumption; Hydrocarbons; Carbon Monoxide

19980015110 Texas Univ., Center for Transportation Research, Austin, TX USA

Analysis of Traffic Congestion and Tropospheric Ozone Levels in San Antonio *Final Report*

Martello, M., Texas Univ., USA; McNerny, M. T., Texas Univ., USA; May 1997; 384p; In English

Report No.(s): PB98-114770; CTR-2979-1F; No Copyright; Avail: CASI; A17, Hardcopy; A03, Microfiche

The findings of this report are based on (1) a statistical analysis of data collected in the San Antonio area, (2) a literature review, and (3) expert advice on tropospheric ozone formation. The results of the study suggest that a highway construction work zone with lane closure can impact the daily peak ozone concentration. The statistical analyses conducted indicate that the range of impacts associated with ozone formation is wide, from near zero parts per billion to much higher levels. Additionally, the literature suggests that the net effect of emissions of the ozone precursor NO(x) depends on when and where they occur, and that such emissions can be harmful and/or beneficial to ozone formation depending on particular circumstances.

NTIS

Traffic; Ozone; Air Pollution; Highways; Statistical Analysis; Congestion; Transportation Networks

19980015126 Georgia Inst. of Tech., School of Earth and Atmospheric Sciences, Atlanta, GA USA

Quantitative Chemical Mass Transfer in Coastal Sediments during Early Diagenesis; Effects of Biological Transport, Mineralogy, and Fabric *Final Report, 1 Jun. - 30 Sep. 1997*

Cappellen, Philippe V., Georgia Inst. of Tech., USA; Oct. 22, 1997; 8p; In English

Contract(s)/Grant(s): N00014-97-I-0879

Report No.(s): AD-A331371; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The work during Phase 1 has focused on: (1) a sensitivity analysis of the effects of irrigation on the biogeochemistry of coastal marine sediments; (2) the upgrading of the existing multicomponent reactive transport model for early diagenesis; and (3) the preliminary development of a stochastic algorithm to represent burrowing activities of benthic macrofauna.

DTIC

Quantitative Analysis; Mass Transfer; Coasts; Sediments; Mineralogy; Irrigation

19980015130 Army Cold Regions Research and Engineering Lab., Hanover, NH USA

On-Site Analysis of Explosives in SOIL: Evaluation of Thin-Layer Chromatography for Confirmation of Analyte Identity

Nam, Sae-Im, Army Cold Regions Research and Engineering Lab., USA; Aug. 1997; 20p; In English

Report No.(s): AD-A330616; CRREL-SR-97-21; SFIM-AEC-ET-CR-97030; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Two colorimetric-based methods are commonly used for on-site analysis of explosives in soil. For the TNT method, acetone soil extracts are reacted with base to produce reddish-colored Janowsky ions. For RDX, acetone extracts are acidified and reacted with zinc to reduce RDX to nitrous acid, and the nitrous acid is determined by reacting the resulting solution with a Griess reagent. The TNT method is subject to interference from the presence of other polynitroaromatic compounds such as TNB, tetryl, and the isomers of DNT. Likewise, the RDX method is interfered with by the presence of other nitra mines such as HMX and tetryl, and organonitrate esters such as NG, PETN, and NC. This study investigates the use of thin-layer chromatography (TLC) as a simple on-site method to confirm the identity of analytes detected using colorimetric on-site methods. Separations using both laboratory-grade and locally available solvents were developed. The major limitation of this method is detection capability, which was estimated to be about 0.1 microgram of analyte. This corresponds to a concentration of 17 micrograms/g when using 30 µL of spotting volume, or 500 micrograms/g when using 1 µL of spotting volume.

DTIC

Acetone; Color; Colorimetry; Detection; Esters; Estimating; Explosives; HMX

19980015139 Desert Research Inst., Reno, NV USA

Vehicle Emissions in Five Urban Tunnels Final Report, 1995 - 1996

Gertler, A. W., Desert Research Inst., USA; Sagebiel, J. C., Desert Research Inst., USA; Wittorff, D. N., Desert Research Inst., USA; Pierson, W. R., Desert Research Inst., USA; Dippel, W. A., Desert Research Inst., USA; Mar. 1997; 322p; In English

Report No.(s): PB97-158091; No Copyright; Avail: CASI; A14, Hardcopy; A03, Microfiche

In 1995, as part of a study designed to locate and evaluate sites for quantifying emissions of ozone forming precursors (oxides of nitrogen (NO_x) and speciated hydrocarbons), carbon monoxide (CO), and particles from the urban light-duty fleet, a series of on-road emissions studies were performed in the Van Nuys (Los Angeles, CA), Sepulveda (Los Angeles, CA), Deck Park (Phoenix, AZ), Lincoln (NY/NJ), and Callahan (Boston, MA) Tunnels. One confounding factor in the direct comparison with previous studies was the inability to separate LD and HD emissions. Taking into account the estimated HD emissions. Taking into account the estimated HD contribution to the observed emissions, the urban light-duty fleet emissions measured in the 1995 experiments do not differ greatly from the interstate fleet emissions observed in the 1992 Fort McHenry and Tuscarora Mountain Tunnel experiments. When comparing the observed emission factors with emission model predictions, EMFAC7F model tended to underpredict CO and hydrocarbon emissions, while correctly predicting NO_x, in the Van Nuys and Sepulveda tunnels. For the non-California tunnels (Deck Park, Lincoln, and Callahan), the MOBILE5a model overpredicted the observed emissions.

NTIS

Combustion Products; Exhaust Emission; Exhaust Gases; Hydrocarbons; Nitrogen Oxides; Air Pollution; Carbon Monoxide

19980015143 Naval Facilities Engineering Command, Norfolk, VA USA

Draft Environmental Impact Statement. Realignment of F/A-18 Aircraft and Operational Functions from Naval Air Station (NAS) Cecil Field, Florida, to Other East Coast Installations: Appendix Volume

Jan. 1997; 516p; In English

Report No.(s): AD-A329791; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Pursuant to Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969, as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500-1508), the Department of the Navy announces its intent to prepare an Environmental Impact Statement (EIS) to evaluate the potential environmental consequences of the realignment of F/A-18 aircraft and their associated personnel to Naval Air Station (NAS) Oceana, located in Virginia Beach, Virginia. This action is being conducted in accordance with the Defense Base Closure and Realignment Act of 1990 (Pub. L. 101-510), as implemented during 1995. In accordance with congressional direction implementing the 1995 recommendations of the Defense Base Closure and Realignment Commission (BRAC 95) the Navy will close NAS Cecil Field, Florida, and realign F/A-18 aircraft, personnel, and ancillary activities associated with the existing F/A-18 aircraft, personnel, and ancillary activities associated with the existing F/A-18 missions.

DTIC

F-18 Aircraft; Environment Management; Environmental Quality; Environmental Surveys; Jet Aircraft; Fighter Aircraft; Military Air Facilities

19980015148 Massachusetts Inst. of Tech., Cambridge, MA USA

Deposition of Contaminated Sediments in Boston Harbor Studied Using Fluorescent Dye and Particle Tracers

Adams, E. E., Massachusetts Inst. of Tech., USA; Stolzenbach, K. D., California Univ., USA; Lee, J. J., Massachusetts Inst. of Tech., USA; Caroli, J., Massachusetts Inst. of Tech., USA; Funk, D., Prime Engineering, Inc., USA; Aug. 1997; 35p; In English Report No.(s): PB97-206320; MITSG-97-17; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The residence time of water and suspended particles in Fort Point Channel, a sub-region of Boston Harbor containing a major combined sewer overflow and highly contaminated sediment, was determined during three field surveys by measuring the disappearance of fluorescent tracers from the water column. Flushing by advective movement was quantified using Rhodamine WT dye, a dissolved tracer which has negligible interaction with suspended sediment. The fate of suspended particles was inferred from measured concentrations of fluorescent pigment particles which were initially well mixed with Rhodamine dye and which have a size range and settling velocity comparable to the sewage particles of interest. Dye and particle concentrations were measured by fluorescent spectroscopy of water samples obtained throughout the channel over a week following tracer introduction. Dye measurements indicate that channel water is replaced on a scale of 1 to 2.7 days, depending on tidal amplitude and phase during tracer release, and the magnitude of freshwater inflow.

NTIS

Contamination; Deposition; Fluorescence; Fresh Water; Harbors; Pigments; Rhodamine; Sediments; Settling; Sewage; Sewers; Size Distribution

19980015153 Federal Aviation Administration, Cambridge, MA USA

US Coast Guard 1995 Oil Pollution Research Grants Publications, Part 2 Final Report

Aug. 1997; 389p; In English

Contract(s)/Grant(s): DTRS57-95-G-00065

Report No.(s): AD-A330202; DOT-VNTSC-CG-97-1.2-Pt-2; CG-M-D-22-97-1-Pt-2; No Copyright; Avail: CASI; A17, Hardcopy; A04, Microfiche

The Oil Pollution Research Grants Program was created by the Oil Pollution Act (OPA) of 1990, P.L. 101-380 (OPA 90), 33 U.S.C. 28761(c)(8) and 2761(c)(9). The OPA established a regional research program and authorized those agencies represented on the Interagency Coordinating Committee on Oil Pollution Research, including the U.S. Coast Guard (USCG), to make grants to universities and other research institutions to perform research related to regional effects of oil pollution. The USCG established such a grant program and the John A. Volpe National Transportation Systems Center (Volpe Center), a component of the Research and Special Programs Administration of the Department of Transportation (DOT), was chosen to administer this program on behalf of the USCG. In August 1995, the Volpe Center awarded seven one-year grants. Coast Guard funds were matched by funds from the university or non-profit research institution. This report contains the final reports for research performed under these grants.

DTIC

Oil Pollution; Oil Slicks; Environment Effects

19980015163 Environmental Protection Agency, Washington, DC USA

Nitrogen Oxides: Impacts on Public Health and the Environment

Price, D., Environmental Protection Agency, USA; Birnbaum, R., Environmental Protection Agency, USA; Batiuk, R., Environmental Protection Agency, USA; McCullough, M., Environmental Protection Agency, USA; Smith, R., Environmental Protection Agency, USA; Aug. 1997; 165p; In English; Incomplete microfiche

Report No.(s): PB98-104631; EPA/452/R-97/002; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The purpose of this document is to describe the multiple impacts on human health and welfare that result from emissions of nitrogen oxides (NO(x)). Emissions of NO(x) result in an unusually broad range of detrimental effects to human health and the environment. In addition, this document states EPA's intent to consider the multiple environmental impacts of NO(x) emissions when making policy decisions regarding regulation of NO(x) emissions.

NTIS

Nitrogen Oxides; Public Health; Air Pollution; Ozone

19980015167 National Weather Service, Climate Prediction Center, Camp Springs, MD USA

Tropospheric Seasonally Varying Mean Climate over the Western Hemisphere (1979-1995)

Kousky, V. E., National Weather Service, USA; Ropelewski, C. F., National Weather Service, USA; May 1997; 184p; In English Report No.(s): PB97-181028; NCEP/ATLAS-3; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

The atlas documents the mean (1979-1995) annual cycle over the Western Hemisphere for selected tropospheric variables. Mean monthly and seasonal analyses for the lower and upper troposphere are presented in a series of 4 panel figures. Analyses of precipitation, derived from satellite estimates and rain gauge observations, and outgoing longwave radiation data from NOAA polar-orbiting satellites are included for comparison with circulation features and precipitation rates from the reanalysis archive. In sections 2-4 the authors describe monthly and seasonal variations for selected prominent circulation features in the Western Hemisphere, such as the subtropical highs, intertropical convergence zones (ITCZs), the Aleutian and Icelandic lows, the upper-tropospheric Bolivian high, the South Atlantic convergence zone (SACZ), and the Northern and Southern Hemisphere jet streams. Whenever possible, these features are related to the annual cycle of precipitation as derived from satellite estimates and rain gauge observations or inferred from satellite observations of outgoing longwave radiation (OLR). A brief evaluation of the Reanalysis vertical motion and precipitation rates is presented in section 5, based on comparisons with OLR and with merged satellite estimates and rain gauge observations of precipitation.

NTIS

Atmospheric Circulation; Troposphere; Satellite Observation; Western Hemisphere; Annual Variations; Long Wave Radiation; Vertical Motion; Climate

19980015169 NASA Washington, Washington, DC USA

Global Atmospheric Effects of Aviation: Report of the Proceedings of the Symposium

May 1997; 106p; In English; Global Atmospheric Effects of Aviation, 15-19 Apr. 1996, USA

Report No.(s): PB97-183297; NASA-CP-3351; NAS 1.55:3351; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The objective of the organizers of the Symposium on the Global Atmospheric Effects of Aviation was to bring scientific, technology, and policy leaders together to review the status of all relevant atmospheric research, for discussion of potential mitigation measures, and to consider what policy-relevant information may be available to decision makers in the next few years. Specially-focused studies to understand and reduce aviation's environmental impact are currently supported and carried out by governments and other organizations throughout the world. Scientific assessments in support of the Montreal Protocol, which recently have included consideration of aviation, are conducted by the Protocol's Ozone Science Panel. The Intergovernmental Panel on Climate Change provides scientific-technical advice to the Framework Convention on Climate Change and its assessments independently to all governments for their use in National policy making. Standards to control emissions from aircraft are established by the International Civil Aviation Organization (ICAO)- itself a United Nations specialized agency, based upon recommendations from its Committee on Aviation Environmental Protection (CAEP).

NTIS

Air Transportation; Atmospheric Effects; Environment Effects; Civil Aviation; Environment Protection; Conferences; Jet Exhaust; Exhaust Emission; Atmospheric Chemistry; Airline Operations

19980015184 Global Geochemistry Corp., Canoga Park, CA USA

Analysis of Acid Precipitation Samples Collected by State Agencies. Sampling Period: January - December 1991 Annual Report

Shepard, L. S., Global Geochemistry Corp., USA; Apr. 1996; 260p; In English

Report No.(s): PB96-175096; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

This report presents analytical data from the 30 acid precipitation collection sites in the State-Operated Network in 1991. This report contains maps showing the location of each site, plots of analytical data, tables of all field and analytical data, plots comparing field and laboratory pH and conductivity, and information on data quality. Samples are analyzed for pH, strong acid, conductivity, fluoride, chloride, nitrite, phosphate, bromide, nitrate, sulfate, ammonium, sodium, potassium, calcium, and magnesium.

NTIS

Acid Rain; Surveys; Sampling; Data Acquisition; Air Pollution

19980015211 California Univ., Lawrence Berkeley Lab., Berkeley, CA USA

Scenarios of U.S. Carbon Reductions: Potential Impacts of Energy Technologies by 2010 and Beyond

Sep. 1997; 268p; In English

Report No.(s): PB98-107659; LBNL-40533; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

This report presents the results of a study conducted by five U.S. Department of Energy National laboratories that quantifies the potential for energy-efficient and low-carbon technologies to reduce carbon emissions in the USA. To add greater definition to this view, we quantify the reductions in carbon emissions that can be attained through the improved performance and increased penetration of efficient and low-carbon technologies by the year 2010. We also take a longer-term perspective by characterizing the potential for future research and development to produce further carbon reductions over the next quarter century. As such, this

report makes a strong case for the value of energy technology research, development, demonstration, and diffusion as a public response to global climate change.

NTIS

Carbon; Energy Technology; Air Pollution; Research Projects; Technology Transfer; Climate Change; Climatology

19980015212 National Academy of Sciences - National Research Council, Committee on Toxicology, Washington, DC USA
Toxicity of Alternatives to Chlorofluorocarbons: HFC-134a and HCFC-123 Final Report

1996; 128p; In English

Report No.(s): PB96-175070; Copyright Waived; Avail: CASI; A07, Hardcopy; A02, Microfiche

As part of the effort to phase out the use of stratospheric ozone-depleting substances, such as chlorofluorocarbons (CFC's) and Halon gases, the U.S. Navy is planning to substitute hydrofluorocarbon HFC-134a for the refrigerant CFC-12, and the Air Force is planning to substitute hydrochlorofluorocarbon (HCFC)-123 for the fire suppressant Halon 1211. The Navy asked the National Research Council (NRC) to review the toxicity data on HFC-134a and to recommend 1-hr and 24-hr Emergency Exposure Guidance Levels (EEGLs) and 90-day Continuous Exposure Guidance Levels (CEGLs). The Air Force requested the NRC to review the adequacy of the 1-min EEGL proposed by the Air Force for HCFC-123. In addition, the U.S. Environmental Protection Agency (EPA) requested the NRC to review the suitability of current methods for detecting and quantifying the risk of cardiac sensitization from exposure to CFCs and their substitutes. This report is intended to aid the Navy, the Air Force and EPA in using CFC substitutes safely.

NTIS

Toxicity; Substitutes; Refrigerants; Depletion; Data Acquisition; Data Processing; Chlorofluorocarbons

19980015234 NERAC, Inc., Tolland, CT USA

Atmospheric Modeling of Air Pollution. (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864095; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development, validation, and application of mathematical models for air pollution studies of mobile and stationary pollution sources. The models cover a wide range of mathematical complexity, utilizing factors such as terrain features, wake effects, diffusion, atmospheric stability, atmospheric wind, precipitation scavenging, gravitational deposition, atmospheric photochemistry, and urban heat islands. The models are used to support environmental impact studies and effects of proposed emission control strategies. Excluded are models of stratospheric pollution behavior, as applied to high flying aircraft. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Air Pollution; Atmospheric Models; Atmospheric Chemistry

19980015238 NERAC, Inc., Tolland, CT USA

Waste Oil Reclamation. (Latest Citations from the NTIS Bibliographic Database)

Mar. 1995; In English; Page count unavailable.

Report No.(s): PB95-876652; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning methods and equipment for reclamation and recycling of waste oils. Citations discuss recovery, disposal, and reuse of lubricating oils. Topics include economic analysis, programs assessment, re-refining techniques, chemical component analysis, and reclaimed oil evaluation. Regulations and standards for waste oil treatment and waste oil refineries are examined. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Lubricating Oils; Reclamation; Waste Treatment

19980015284 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Climate Change and Neotectonic History of Northwestern China

Farr, Tom G., Jet Propulsion Lab., California Inst. of Tech., USA; Chadwick, Oliver, Jet Propulsion Lab., California Inst. of Tech., USA; Evans, Diane, Jet Propulsion Lab., California Inst. of Tech., USA; Gillespie, Alan, Washington Univ., USA; Peltzer, Gilles, Jet Propulsion Lab., California Inst. of Tech., USA; Tapponnier, Paul, Paris Univ., France; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 48-51; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The progress, results and future plans for the following objectives are presented: (1) to compare the types, rates, and magnitudes of surficial modification processes that have operated in Northwest China and the Southwestern U.S.; (2) to quantify and understand the basis of the remote sensing signatures of these processes to allow extrapolation from field sites to regional maps and to allow comparisons between widely separated arid regions; (3) to use the resulting chronologies to help define the temporal and spatial distribution of continental climate changes; and (4) Determine the ages of movements on some of the active faults in Northwestern China.

Derived from text

Remote Sensing; Tectonics; Radar Signatures; Image Analysis; Shuttle Imaging Radar; Synthetic Aperture Radar; Climate Change

19980015336 Radian Corp., Research Triangle Park, NC USA

Criteria Pollutant Emissions from Internal Combustion Engines in the Natural Gas Industry, Volume 1, Technical Report Final Report, Jun. 1994 - Dec. 1995

Workman, G. S., Radian Corp., USA; Adams, R. G., Radian Corp., USA; Shareef, G. S., Radian Corp., USA; Feb. 1996; 87p; In English

Contract(s)/Grant(s): EPA-68-D2-0160T33; GRI-5091-274-2293

Report No.(s): PB96-168265; RAD-275-114/298-130-33-Vol-1; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The report contains emissions data for nitrogen oxides (NO_x), carbon monoxide (CO), methane (CH₄), ethane (C₂H₆), Non-Methane HydroCarbons (NMHC), and NonMethane-Ethane HydroCarbons (NMEHC) from stationary Internal Combustion (IC) engines and gas turbines used in the natural gas industry. Test results for individual engines tested are presented, along with full load engine family-specific factors, and the calculated emissions factors are evaluated relative to the emission factors published in EPA report AP-42. Units tested included eleven 2-stroke engines and five 4-stroke engines, with and without controls, and two gas turbines.

NTIS

Internal Combustion Engines; Gas Turbine Engines; Pollution Monitoring; Natural Gas; Industries; Air Pollution; Emission Spectra

19980015351 Pacific Environmental Services, Inc., Research Triangle Park, NC USA

SCREEN3 Model User's Guide

Brode, R. W., Pacific Environmental Services, Inc., USA; Sep. 1995; 61p; In English

Report No.(s): PB95-222766; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This document presents user instructions on the use of the SCREEN3 screening model. SCREEN3 is a PC-driven, Gaussian-plume atmospheric dispersion model which calculates maximum 1-hour, downwind concentrations of non-reactive pollutants. The primary revision between SCREEN2 and SCREEN3 is the incorporation of the numerical integration algorithm for area sources. The SCREEN3 model serves as a regulatory screening model to determine compliance with the National Air Quality Standard (NAAQS) or other air quality standards.

NTIS

Atmospheric Diffusion; User Manuals (Computer Programs); Computation; Atmospheric Models; Air Pollution; Contaminants

19980015359 MBC Applied Environmental Sciences, Inc., Costa Mesa, CA USA

Proceedings of the 1995 Arctic Synthesis Meeting

Feb. 1996; 239p; In English; 1995 Arctic Synthesis Meeting, 23-25 Oct. 1995, Anchorage, AL, USA

Contract(s)/Grant(s): DI-14-35-0001-30570

Report No.(s): PB97-105449; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

This Arctic Synthesis Meeting, sponsored by the Alaska OCS Region of the Minerals Management Service, is in the sixth major information meeting since 1978 dealing with the status of information on the Beaufort Sea. We focus this meeting on information about potential development areas in the central coastal Beaufort Sea, such as Northstar, Kuvlum, and others. A session on industry plans was followed by sessions on sociocultural information, bowhead whales, general biology, and physical oceanography.

NTIS

Beaufort Sea (North America); Conferences; Alaska

19980015369 Environmental Protection Agency, National Risk Management Research Lab., Research Triangle Park, NC USA
Hazardous Air Pollutants from the Combustion of an Emulsified Heavy Fuel Oil in a Firetube Boiler Final Report, May - Nov. 1995

Miller, C. A., Environmental Protection Agency, USA; Feb. 1996; 105p; In English

Report No.(s): PB96-168281; EPA/600/R-96/019; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The report gives results of measuring emissions of Hazardous Air Pollutants (HAPs) from the combustion flue gases of a No. 6 fuel oil, both with and without an emulsifying agent, in a 2.5 million Btu/hr (732 kW) firetube boiler with the purpose determining the impacts of the emulsifier on HAP emissions. The boiler flue gases were sampled and analyzed for both metal and organic HAPs, and the effects of the emulsification on criteria emissions such as Carbon Dioxide (CO), Nitrogen Oxides (NO_x), and Particulate Matter (PM) were also measured.

NTIS

Fuel Oils; Combustion Products; Air Pollution; Hazardous Materials

19980015372 Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC USA
EPA Air Quality Trends (A Summary of the National Air Quality and Emissions Trend Report, 1994)

Freas, W., Environmental Protection Agency, USA; Stackhouse, D., Environmental Protection Agency, USA; Sansevero, C., Environmental Protection Agency, USA; Fitz-Simons, T., Environmental Protection Agency, USA; Hemby, J., Environmental Protection Agency, USA; Sep. 1995; 16p; In English

Report No.(s): PB96-168844; EPA/454/F-95/033; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The brochure is a summary of trends in the nation's air quality for the last 10 years. It highlights the USA Environmental Protection Agency's (EPA's) most recent analysis of trends in air pollution emissions and air quality concentrations. In addition to a summary of the trends for the six 'criteria' pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM-10), a sulfur dioxide (SO₂), the brochure also provides an overview of trends in toxic air pollution, sources of toxic air emissions, and the process EPA has developed for controlling toxic air pollution.

NTIS

Trends; USA; Air Quality; Air Pollution; Pollution Control; Pollution Monitoring

19980015381 Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC USA
Superfund Record of Decision (EPA Region 4): Alabama Army Ammunition Plant, Area B SOIs Operable Unit, Childersburg, AL., November 14, 1995

Mar. 1996; 83p; In English

Report No.(s): PB95-964035; EPA/ROD/R04-95/251; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This decision document presents the selected remedial action for the contaminated soils and sediments in Study Areas, 6, 7, and 21, and the Industrial Sewer System (ISS) in Study Areas 6, 7, and 10 within Area B at the Alabama Army Ammunition Plant (ALAAP), Childersburg, Alabama. The Area B SOIs Operable Unit addresses the principal threats from soils and sediments in Study Areas 6, 7, and 21, and underground industrial sewer lines in Study Areas 6, 7, and 10. The soils and sediments and the industrial sewer lines are contaminated with explosives and lead.

NTIS

Hazardous Materials; Waste Disposal; Pollution Control; Contamination; Land Management; SOIL Pollution

19980015392 Environmental Protection Agency, Science Advisory Board, Washington, DC USA
SAB Report: The Cumulative Exposure Project. Review of the Office of Planning, Policy, and Evaluation's Cumulative Exposure Project (Phase 1) by the Integrated Human Exposure Committee

Sep. 1996; 48p; In English

Report No.(s): PB97-105530; EPA-SAB-IHEC-ADV-96-004; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Office of Policy, Planning, and Evaluation (OPPE) Cumulative Exposure Project is intended to provide a National distribution of cumulative exposures to environmental pollutants, providing comparisons of exposures across communities, exposure pathways, and demographic groups.

NTIS

Environment Pollution; Dosage; Exposure

19980015395 Apogee Research Corp., Bethesda, MD USA

Resource Significance Protocol for Environmental Project Planning Final Report

Doll, Amy, Apogee Research Corp., USA; Rubin, Kenneth I., Apogee Research Corp., USA; Jul. 1997; 162p; In English
Report No.(s): AD-A331323; IWR-97-R-4; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This report is the final product of the Significance Work Unit in the Evaluation of Environmental Investments Research Program. The document is a protocol or guidance document for identifying and documenting resources that are recognized as environmentally significant (a surrogate measure for worthiness of investment). Resources may have Institutional, Technical or Public Significance in any one or combination of the three. They may also be recognized as significant at differing levels: Federal, regional, state and local. The protocol helps the user to determine whether a resource has a particular level of significance, and provides a worksheet to better organize available information about the resource(s). The work-sheets are particularly helpful in that they summarize the information about all identified significant resources, thus providing valuable information useful in preparing Significance Statements. The document provides numerous examples of significance statements for various environmental resources. The previous document in this work unit: "Significance in Environmental Project Planning: Resource Document," provides direction on where to find information on significant resources. It identifies numerous agencies and organizations which provide needed information as well as guidance on requesting that information. The Resource Document was intended to be a companion to the Significance Protocol. Because copies are no longer available, it is now an Addendum to the Significance Protocol.

DTIC

Project Planning; Environment Management

19980015411 Geological Survey, Water Resources Div., Idaho Falls, ID USA

Evaluation of Quality Assurance/Quality Control Data Collected by the US Geological Survey for Water-Quality Activities at the Idaho National Engineering and Environmental Laboratory, Idaho, 1994 through 1995

Williams, L. M., Geological Survey, USA; Mar. 1997; 97p; In English

Report No.(s): PB97-180947; USGS/WRI-97-4058; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

The purpose of the report is to present an evaluation of the quality assurance/quality control (QA/QC) data from the water-quality monitoring program conducted by the USGS at the INEL. Analytical results of the replicate pairs of samples are reported and compared for statistical equivalence. The replicate-pair analytical data and the results of the comparisons are compiled and tabulated along with the source-solution, trip- and equipment-blank analytical data. Included in the report is a brief description of the methods and procedures used by field personnel for collection of replicate pairs of samples and preparation of blanks.

NTIS

Quality Control; Water Pollution; Sampling; Water Quality; Chemical Analysis

19980015416 Battelle Memorial Inst., Columbus, OH USA

Lead Exposure Associated with Renovation and Remodeling Activities

Menkedick, J. R., Battelle Memorial Inst., USA; Menton, R. G., Battelle Memorial Inst., USA; Constant, P., Battelle Memorial Inst., USA; Lordo, R. A., Battelle Memorial Inst., USA; Strauss, W. J., Battelle Memorial Inst., USA; May 1997; 43p; In English
Contract(s)/Grant(s): EPA-68-D5-0008

Report No.(s): PB97-185953; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Residential Lead-Based Paint Hazard Reduction Act (Section 402; Title X) required the U.S. Environmental Protection Agency (EPA) to conduct a study of lead exposure associated with renovation and remodeling (R&R) activities (the R&R study). The study, conducted from 1993 to 1995, gathered information to be used to help determine which groups of people conducting R&R activities require training, certification, or educational materials. The study was designed to satisfy two objectives: (1) Determine the extent to which persons engaged in various types of R&R activities are exposed to lead; and (2) Determine the extent to which persons engaged in various types of R&R activities disturb lead and create a lead-based paint hazard on a regular or occasional basis to building occupants or other exposed individuals.

NTIS

Paints; Exposure; Occupational Diseases; Lead Poisoning; Operational Hazards

19980015439 Radian Corp., Research Triangle Park, NC USA

Criteria Pollutant Emissions from Internal Combustion Engines in the Natural Gas Industry, Volume 2, Appendices A - I Final Report, Jun. 1994 - Dec. 1995

Workman, G. S., Radian Corp., USA; Adams, R. G., Radian Corp., USA; Shareef, G. S., Radian Corp., USA; Feb. 1996; 451p; In English

Contract(s)/Grant(s): GRI-5091-274-2293; EPA-68-D2-0160T33

Report No.(s): PB96-168273; RAD-275-114/298-130-33-Vol-2; No Copyright; Avail: CASI; A20, Hardcopy; A04, Microfiche

Contents include the following: Sample Calculations; CEMS and Operation Data; CEMS Summary Data; GC Data; GC Summary Data; Raw Operating Data; Manual Measurement Data; Fuel Analysis Results; and Quality Assurance and Quality Control (QA/QC).

NTIS

Gas Turbine Engines; Pollution Monitoring; Computation; Natural Gas; Industries; Air Pollution; Data Bases; Exhaust Emission

19980015648 Army Cold Regions Research and Engineering Lab., Hanover, NH USA

Site Remediation via Dispersion by Chemical Reaction (DCR)

Marion, Giles M., Army Cold Regions Research and Engineering Lab., USA; Payne, James R., Army Cold Regions Research and Engineering Lab., USA; Brar, Gurdarshan S., Army Cold Regions Research and Engineering Lab., USA; Aug. 1997; 29p; In English

Report No.(s): AD-A330681; CRREL-SR-97-18; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The DCR (Dispersion by Chemical Reaction) technologies are a group of patented waste treatment processes using CaO (quicklime) for the immobilization of heavily oiled sludges, oil-contaminated soils, acid-tars, and heavy metals in Ca(OH)₂ and CaCO₃ matrices. The objectives of this project were to: (1) evaluate the DCR process for remediating soils contaminated with pesticides, petroleum hydrocarbons (oils and fuels), and heavy metals in cold regions and (2) evaluate DCR-treated oil-contaminated soil as a non-frost-susceptible (NFS) construction material. Three major studies evaluated the DCR process to remediate (1) hydrocarbons at Eareckson Air Force Station on Shemya in the Aleutians, (2) pesticide-contaminated soils from Rocky Mt. Arsenal, and (3) heavy-metal contaminated soils from a former zinc smelter site at Palmerton, Pennsylvania. The DCR process was successful in stabilizing liquid organics and heavy metals in contaminated soils. The chemical properties of soils contaminated by solid organics (asphalt tar and pesticides) were not generally improved by the DCR process, but even in these cases, the physical properties were improved for potential reuse as construction materials. Following laboratory verification for a specific waste, we can recommend the DCR process for the field remediation of liquid organics and heavy-metal-contaminated materials.

DTIC

Aleutian Islands (US); Chemical Properties; Chemical Reactions; Contamination; Hydrocarbons; Immobilization; Low Temperature Environments; Pesticides; Sludge; Stabilization; Waste Treatment

19980015740 Gallup Organization, Inc., Lincoln, NE USA

Usage Patterns of Passenger Cars and Trucks Final Report, 1992-1994

1994; 344p; In English

Contract(s)/Grant(s): A994-191

Report No.(s): PB96-188214; Copyright Waived; Avail: CASI; A15, Hardcopy; A03, Microfiche

The objective of the study was to determine various vehicle utilization patterns that are needed to update and verify vehicle activity for emissions inventory estimations. The contract, sponsored by the American Automotive Manufacturers Association and co-funded by the California Air Resources Board with the Gallup Organization as the sub-contractor, involved data collection through surveys, data analysis and a report on vehicle usage patterns, focusing on passenger cars and light- and medium-duty trucks. The information collected included the model year and make of the vehicle, odometer readings at the end of each trip, time and location at the start and end of a trip, number of passengers during each trip, trip length, trip purpose, type of fuel used and refueling events, parking conditions (enclosed garage, open-shaded or exposed area), number of work hours and number of work days per week, etc. Vehicle owners were randomly selected from various cities throughout the USA.

NTIS

Trucks; Automobiles; Air Pollution

19980015745 NERAC, Inc., Tolland, CT USA

Catalytic Destruction of Volatile Pollutants. (Latest citations from Pollution Abstracts)

Jan. 1996; In English

Report No.(s): PB96-859657; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the use of catalysts to prevent or remediate environmental pollution caused by nitrogen oxides, sulfur oxides or volatile organic compounds. Chemical conversion processes for the oxidation or reduction of these substances to innocuous compounds are presented. Theoretical aspects of the thermodynamics and kinetics of the conver-

sion process are presented. The citations examine current catalytic technology and describe efforts to design catalysts that are cheaper to produce, more efficient, more selective, and more resistant to contamination. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Catalysts; Environment Pollution; Pollution Control

19980015928 Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC USA
Air Emissions from Municipal Solid Waste Landfills: Background Information for Final Standards and Guidelines

Dec. 1995; 314p; In English

Report No.(s): PB96-153465; EPA/453/R-94/021; No Copyright; Avail: CASI; A14, Hardcopy; A03, Microfiche

Final standards and guidelines for the regulation of air emissions from MSW landfills are being promulgated under the authority of section 111 of the Clean Air Act, as amended in 1990. The standards and guidelines will apply to Municipal Solid Waste (MSW) landfills with greater than 2.5 million Mg or 2.5 million cu m or refuse in place and emitting 50 Mg/yr or more annually of nonmethane organic compounds. The standards and guidelines were proposed in the Federal Register on May 30, 1991 (56 FR 24468). The document summarizes all comments received by the Agency and the Agency's responses.

NTIS

Landfills; Emission; Standards; Environment Effects; Solid Wastes; Waste Management; Air Pollution

19980016013 Department of the Navy, Washington, DC USA

Spinning Filter Separation System for Oil Spill Clean-Up Operation

Wehrle, John, Inventor, Department of the Navy, USA; Fischer, Eugene C., Inventor, Department of the Navy, USA; Kenney, William P., Inventor, Department of the Navy, USA; Korczynski, Joseph F., Inventor, Department of the Navy, USA; Gracik, Thomas D., Inventor, Department of the Navy, USA; Sep. 26, 1996; 11p; In English

Patent Info.: US-Patent-Appl-SN-725217

Report No.(s): AD-D018623; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

According to current technology, effective clean up of oil spills from the surface of ocean water is performed by an oil sweeper vessel within which oil contaminated water is collected for transport to remotely located on-shore equipment within which oil separation and disposal is performed. The processing of large quantities of oil polluted ocean water is accordingly time consuming as well as costly. It is therefore an important object of the present invention to provide a less costly oil spill clean up system involving more rapid processing of large quantities of oil polluted ocean water. In accordance with the present invention, oil polluted ocean water is processed at an oil spill location by continuous separation during pressurized flow of the water through at least two separator devices within which successive reduction in oil concentration is effected with respect to a separated portion of the water by filtered flow through porous membrane walls to correspondingly increase the oil concentration within the other remaining portion of water being processed. The first portion of the processed water when sufficiently reduced in oil concentration is discharged for return to the oil spill location, while the remaining portion is collected until a sufficient level of oil concentration therein is achieved to permit disposal thereof by burning at the oil spill site.

DTIC

Patent Applications; Separators; Porous Walls; Inventions; Oil Pollution; Fluid Filters; Oil Slicks

19980016090 Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC USA

Superfund Record of Decision (EPA Region 4): Milan Army Ammunition Plant, Operable Units 3 and 4, Milan, TN., October 2, 1995

Mar. 1996; 76p; In English

Report No.(s): PB96-964001; EPA/ROD/R04-96/241; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This decision document presents the selected remedial action for the soil within the northern industrial area of Milan Army Ammunition Plant, Milan, Tennessee. The goal of the cleanup activities at the northern industrial areas of MAAP is to remove the soil contaminated with explosives compounds above risk-based levels. The excavated soil will be treated using a bioremediation process to reduce the concentrations of explosives compounds, the toxicity of the leachate, and the mobility of the remaining organic compounds. The treated soil will then be placed in an on-site solid waste landfill in compliance with State of Tennessee regulations. Additionally, in areas where excavation of the explosives-contaminated soil is infeasible, the soil will be covered with

an engineered cap to prevent worker exposure to the explosives compounds and prevent leaching of these compounds to groundwater.

NTIS

Hazardous Materials; Waste Disposal; SOIL Pollution; Ammunition; Solid Wastes; Contamination

19980016127 Venezia (Ronald A.), Cary, NC USA

Large Buildings Characteristics as Related to Radon Resistance: A Literature Review

Venezia, R. A., Venezia (Ronald A.), USA; May 1997; 98p; In English

Contract(s)/Grant(s): EPA P.O. 4D2010NATA

Report No.(s): PB97-167134; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

The report gives results of a literature review to determine to what useful extent buildings have been characterized and a data base developed in relation to radon entry and mitigation. Much in the available literature on large building characteristics is directed toward energy conservation and heating, ventilation, and air-conditioning (HVAC) system design and operation. Data on floor space to footprint ratio, separation of lower level from upper floors, floor bypasses, and building foundation design/construction are lacking. Radon diagnostic and mitigation strategies are also lacking for large buildings.

NTIS

Air Conditioning Equipment; Energy Conservation; Space Heating (Buildings); Systems Engineering; Ventilation

19980016128 Battelle Memorial Inst., Columbus, OH USA

Lead Exposure Associated with Renovation and Remodeling Activities: Worker Characterization and Blood-Lead Study

Menton, R. G., Battelle Memorial Inst., USA; Menkedick, J. R., Battelle Memorial Inst., USA; Schulman, J., Battelle Memorial Inst., USA; Strauss, W. J., Battelle Memorial Inst., USA; Egel, J. N., Battelle Memorial Inst., USA; May 1997; 185p; In English
Report No.(s): PB97-186019; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

The Residential Lead-Based Paint Hazard Reduction Act (Title X) required the U.S. Environmental Protection Agency (EPA) to conduct a study of lead exposure associated with renovation and remodeling (R&R) activities (the R&R study). The report presents the results of one of the principal data collection efforts in the R&R study: the Worker Characterization and Blood-lead Study (WCBS). The primary goal of the WCBS was to collect data and information that would permit an assessment of the relationship between R&R activities and lead exposure to the R&R workers conducting the activities. The study surveyed two groups of workers (union carpenters and employees of independent contractors) in two cities (Philadelphia, Pennsylvania, and St. Louis, Missouri). The collected data included: (1) Worker blood samples that were chemically analyzed for lead concentration; and (2) Questionnaire data on demographics, and extent to which specific R&R work activities were conducted, work practices, previous training on or knowledge about lead, and non-work activities and personal characteristics that are potentially related to lead exposure.

NTIS

Environment Protection; Exposure; Hazards; Characterization; Data Acquisition

19980016133 Alaska Univ., School of Fisheries and Ocean Sciences, Fairbanks, AK USA

Effects of the Exxon Valdez Oil Spill on Shallow Subtidal Communities in Prince William Sound, Alaska, 1989 - 1993 Final Report

Jewett, S. C., Alaska Univ., USA; Dean, T. A., Coastal Resources Associates, Inc., USA; Smith, R. O., Coastal Resources Associates, Inc., USA; Stekoll, M., Alaska Univ., USA; Haldorson, L. J., Alaska Univ., USA; Jun. 1995; 365p; In English

Report No.(s): PB96-194865; No Copyright; Avail: CASI; A16, Hardcopy; A03, Microfiche

Injuries to several of the dominant taxa in the nearshore subtidal community were observed in the heavily oiled portions of western Prince William Sound following the Exxon Valdez oil spill of March 1989. The initial effects were most pronounced in more protected eelgrass and silled fjord habitats, where PAH (polycyclic aromatic hydrocarbon) concentrations in sediments exceeded 1000 ng g⁻¹ in 1990. By 1993, PAH concentrations in sediments declined to less than 100 ng g⁻¹, and there were far fewer differences between oiled and control sites with respect to the abundance of dominant plant, invertebrate, and fish taxa. However, not all taxa had recovered fully.

NTIS

Oil Slicks; Prince William Sound (AK); Polycyclic Aromatic Hydrocarbons; Habitats; Water Pollution; Environment Effects; Marine Biology

19980016134 Acurex Corp., Incineration Research Facility, Jefferson, AR USA

Operations and Research at the U.S. EPA Incineration Research Facility, 1995 Annual Report

Waterland, L. R., Acurex Corp., USA; Jul. 1996; 93p; In English

Report No.(s): PB96-194097; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

During fiscal year 1995 (FY95), the last few tests of the Superfund Innovative Technology Evaluation (SITE) demonstration of the pulse combustion burner technology developed by Sonotech, Inc. were completed, with subsequent data evaluation efforts carried through to test report submittal. In addition, two new major test programs were completed. The first was a direct-fired thermal desorption treatability study on two pesticide-contaminated soils from the Rocky Mountain Arsenal. This test program was supported by Argonne National laboratory. The second was a series of demonstration tests of 10 prototype Continuous Emission Monitors (CEMs) for measuring concentrations of trace metals, mercury, trace Volatile Organic Compounds (VOCs), and trace SemiVolatile Organic Compounds (SVOCs) in incinerator flue gas. The program was supported by the Environmental Technology Initiative.

NTIS

Hazardous Materials; Research Facilities; Technologies; Combustion; Burners; Incinerators; Data Processing

19980016152 Environmental Protection Agency, Office of Groundwater and Drinking Water's Technical Support Div., Cincinnati, OH USA

ICR Sampling Manual, April 1996

Apr. 1996; 144p; In English

Report No.(s): PB96-157508; EPA/814/B-96/001; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The Information Collection Rule (ICR), found in Subpart M to 40 CFR Part 141 - National Primary Drinking Water Regulations, requires each public water system (PWS) that meets certain applicability criteria to collect specified information for the limited period of time. The target audience for the manual is the person(s) located at each affected PWS who is/are responsible for understanding and complying with the sampling requirements of the ICR. Therefore, the purpose of the manual is to provide detailed requirements and guidance for affected PWSs to accomplish the following in accordance with the ICR: Develop an Initial Sampling Plan and utilize it to develop Monthly Sampling Plans and generate Final Design data; utilize Monthly Sampling Plans and report to collect appropriate samples and supporting information; utilize suitable sampling techniques (and containers) to collect and ship representative samples to EPA-approved laboratories for analyses; and report appropriate data electronically to EA at required intervals.

NTIS

Potable Water; Sampling; Manuals; Water Pollution

19980016308 Radian Corp., Austin, TX USA

Review of Control Options for Methyl Bromide in Commodity Treatment Final Report, Sep. 1994 - Aug. 1995

DeWolf, G. B., Radian Corp., USA; Phillips, J. L., Radian Corp., USA; Mar. 1996; 35p; In English

Report No.(s): PB96-167556; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The report describes recent developments in the control of methyl bromide (MeBr) and discusses technical considerations and requirements for and the economic feasibility of recovery. The primary focus of the report is on quarantine applications using MeBr. Two of the most promising approaches to recovery, recycle, and reuse continue to be physical adsorption on a solid sorbent and cryogenic condensation. In addition to discussing these technologies, the report identifies some of the critical considerations for process economics and remaining information gaps. The review concludes that recovery, recycle, and reuse appear to be feasible, have not been unequivocally proven to be so, and there is little current incentive to pursue such technologies unless there is hope of exemptions to or rescission of the MeBr ban.

NTIS

Methyl Compounds; Bromides; Pollution Control; Fumigation

19980016378 Minerals Management Service, Herndon, VA USA

Oil-Spill Risk Analysis: Beaufort Sea Outer Continental Shelf Lease Sale 170 Final Report

Anderson, C. M., Minerals Management Service, USA; Johnson, W. R., Minerals Management Service, USA; Marshall, C. F., Minerals Management Service, USA; Lear, E. M., Minerals Management Service, USA; Feb. 1997; 68p; In English

Report No.(s): PB97-157036; OCS/MMS-96/0068; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report summarizes results of an oil-spill risk analysis conducted for OCS Lease Sale 170, Beaufort Sea. The objective of this analysis was to estimate relative risks associated with oil and gas production for the proposed lease sale.

NTIS

Beaufort Sea (North America); Continental Shelves

19980016549 Environmental Protection Agency, Office of Water, Washington, DC USA

Benefits and Costs of Prevention: Case Studies of Community Wellhead Protection, Volume 1

Nov. 30, 1995; 74p; In English

Report No.(s): PB96-188271; EPA/813/B-95/005; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The benefits of avoiding contamination of community drinking water sources are greater than the costs of implementing a local prevention program for wellhead protection. WellHead Protection (WHP) offers community leaders a less expensive approach to protecting public health and avoiding the costs of remediating future contamination of their ground water sources of drinking water. This analysis of seven communities shows that, on average, dealing with contamination of their ground water supply may be 30 or 40 times more costly than preventing it in the first place. The wellhead protection program is designed under the Safe Drinking Water Act (Section 1428) to prevent contamination from entering the ground waters supplying public water wells.

NTIS

Wells; Contamination; Ground Water; Prevention; Cost Reduction; Drinking

19980016553 Environmental Protection Agency, National Exposure Research Lab., Cincinnati, OH USA

ICR Microbial Laboratory Manual, April 1996

Fout, G. S., Environmental Protection Agency, USA; Schaefer, F. W., Environmental Protection Agency, USA; Messer, J. W., Environmental Protection Agency, USA; Dahling, D. R., Environmental Protection Agency, USA; Stetler, R. E., Environmental Protection Agency, USA; Apr. 1996; 233p; In English

Report No.(s): PB96-157557; EPA/600/R-95/178; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

To balance the risks from pathogens and chemicals, the Advisory Committee made several recommendations and the final results was the development of three new drinking water regulations. The Disinfectant/Disinfection By-Product Rule was the primary rule negotiated. The second rule developed during the negotiation process is the Enhanced Surface Water Treatment Rule (ESWTR). It specifies levels of treatment to control pathogens in drinking water based on microbial quality of the source water. The third rule that was recommended by the Advisory Committee is the Information Collection Requirements Rule (ICR). The most critical element of the ICR involves the collection of data on the concentrations of specific microbes.

NTIS

Potable Water; Surface Water; Water Treatment; Pathogens; Antiseptics; Microorganisms

19980016554 Environmental Protection Agency, Office of Groundwater and Drinking Water's Technical Support Div., Cincinnati, OH USA

ICR Manual for Bench- and Pilot-Scale Treatment Studies

Apr. 1996; 375p; In English

Report No.(s): PB96-157524; EPA/814/B-96/003; No Copyright; Avail: CASI; A16, Hardcopy; A03, Microfiche

The Information Collection Rule (ICR) for Public Water Systems requires public water systems that meet certain applicability criteria to conduct disinfection byproduct (DBP) precursor removal studies, referred to as treatment studies. These treatment studies are intended to provide cost and performance data on granular activated carbon (GAC) and membrane processes for meeting the DBP regulations. The purpose of the manual is to provide the information necessary to conduct these studies. The manual is referenced in the final ICR regulation and contains the specific requirements for conducting treatment studies. The document is divided into three parts: Part 1 summarizes the ICR regulation, including criteria to determine applicability to the treatment study requirement and includes applications for treatment study options, and provides general guidelines for conducting the treatment studies; Part 2 details the requirements of the bench- and pilot-scale GAC studies; Part 3 details the requirements of the bench- and pilot-scale membrane studies.

NTIS

Potable Water; Water Pollution; Water Treatment; Manuals; Tests

19980016555 Environmental Protection Agency, Office of Groundwater and Drinking Water's Technical Support Div., Cincinnati, OH USA

DBP/ICR Analytical Methods Manual

Apr. 1996; 140p; In English

Report No.(s): PB96-157516; EPA/814/B-96/002; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The purpose of the manual is to provide detailed information to the laboratory community that will be analyzing the samples collected by the Public Water Systems to meet the ICR requirements. The manual is intended to: Describe the laboratory approval process; describe the procedures that EPA will use to assess a laboratory's ability to produce data of known accuracy and precision; describe laboratory data quality control requirements for ICR analyses; specify how ICR data are to be reported back to the utilities and to EPA; and clarify specific analytical procedures that are not adequately described in some methods that are referenced in this manual or that are unique to the ICR.

NTIS

Potable Water; Water Pollution; Manuals; Tests

19980016565 Battelle Memorial Inst., Columbus, OH USA

Lead Exposure Associated with Renovation and Remodeling Activities: Environmental Field Sampling Study, Volume 2, Appendices

Menkedick, J. R., Battelle Memorial Inst., USA; Menton, R. G., Battelle Memorial Inst., USA; Constant, P., Battelle Memorial Inst., USA; Lordo, R. A., Battelle Memorial Inst., USA; Strauss, W. J., Battelle Memorial Inst., USA; May 1997; 134p; In English
Report No.(s): PB97-185946; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Table of Contents: Support Tables and Figures of EFSS Data; Data Processing and Outlier Detection; Statistical Methods and Models in the EFSS; and Quality Control.

NTIS

Outliers (Statistics); Quality Control; Air Sampling

19980016568 Bartok (William), Inc., Westfield, NJ USA

Proceedings: GRI Workshop on Numerical Modeling of Gas Injection into Large Boilers for NO(x) Emission Control

Bartok, W., Bartok (William), Inc., USA; Feb. 1997; 283p; In English; GRI Workshop on Numerical Modeling of Gas Injection into Large Boilers for NO(x) Emission Control, 16-17 May 1996, Chicago, IL, USA

Contract(s)/Grant(s): GRI-5095-290-3275

Report No.(s): PB97-160915; No Copyright; Avail: CASI; A13, Hardcopy; A03, Microfiche

The purpose of the workshop was to provide a forum to exchange information on the state-of-the-art of numerical modeling of natural gas injection to control NOx emissions from large boilers of different firing design types with an emphasis on coal fired units. The Workshop topic was the application of Computational Fluid Dynamics (CFD), combustion chemistry, and NOx formation and destruction kinetics, to the secondary injection of natural gas into the upper furnace, with consequential downstream reactions for NOx reduction and possible other events such as CO oxidation. The Workshop objectives included defining the state-of-the-art of modeling, identifying knowledge gaps, defining RD&D needs, defining distinguishing model features, defining model validation methodology, and establishing criteria for reliable use of predicted modeling.

NTIS

Boilers; Computational Fluid Dynamics; Computerized Simulation; Combustion Chemistry; Furnaces; Mathematical Models

19980016616 NERAC, Inc., Tolland, CT USA

Radioactive Pollution: Ocean Environments (Latest Citations from Oceanic Abstracts)

May 1996; In English; Page count unavailable.

Report No.(s): PB96-869763; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This bibliography contains citations concerning radioactive pollution of the marine environment. Distributions of radionuclides that indicate artificial radioactive contamination are discussed including iodine-131, various uranium isotopes, Cesium-137, Cobalt-60, Strontium-90, Ruthenium-160, and plutonium isotopes. Ecosystems considered include coral reefs and atolls, planktonic zones in the open ocean, salt marshes, estuaries, coastal waters, and the Mediterranean Sea. Sources of radioac-

tive contamination examined include atomic bomb blasts, fossil fuel combustion, radioactive waste disposal, and nuclear accidents. Experimental simulation of radionuclide transport in marine biota is included.

NTIS

Atolls; Cesium; Coastal Water; Cobalt; Contamination; Coral Reefs; Ecosystems; Estuaries; Fission Weapons; Fossil Fuels; Fuel Combustion; Iodine; Marine Environments

19980016634 Environmental Protection Agency, Seattle, WA USA

Microscopic Particulate Analysis (MPA) for Filtration Plant Optimization *Final Report*

Harris, S., Environmental Protection Agency, USA; Vasconcelos, J., Environmental Protection Agency, USA; Hancock, C., CH Diagnostics and Consulting Service, USA; Apr. 1996; 44p; In English

Report No.(s): PB96-192737; EPA/910/R-96/001; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Performance of water treatment plants can be evaluated by a number of methods, including turbidity, particle counts, and Microscopic Particulate Analysis (MPA). MPA, including particle sizing, is performed on drinking water systems where some form of treatment, chemical or physical, exists between the natural water source and its distribution to the public. This analysis compares the type, size and quantities of bioindicators and particles found in the raw water to those found in the finished, or treated, water. This method can be used to evaluate filtration efficiencies, as log reduction, of conventional filtration systems, as well as on-site evaluation of alternate filtration technologies.

NTIS

Water Treatment; Potable Water; Particulates; Filtration

19980016636 Texas Univ., Center for Research in Water Resources, Austin, TX USA

Global Climate Change Response Program: Hydrological Predictands for Climate-Change Modeling *Final Report*

Ward, G. H., Texas Univ., USA; Proesmans, P., Texas Univ., USA; May 1996; 141p; In English

Report No.(s): PB96-181367; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The objective was pursued by detailed study of the performance of real reservoirs from the midwest of the USA. Various statistics were constructed based upon a theoretical formulation of reservoir storage, design practice in the field, and rules-of-thumb and intuition, and evaluated from the time series of reservoir performance. Among the potentially useful statistics evaluated is an upper bound on the ratio of firm yield to net inflow (in this work, 60 percent appeared favorable, but this result needs further testing with more reservoirs). On the other hand, this study found no useful relation between firm yield and critical low flow, no matter how this low flow is defined and independent of its duration.

NTIS

Water Balance; Climate Change; Hydrological Cycle; Models; Climate Models

19980016650 Environmental Protection Agency, Office of Water, Washington, DC USA

Business Benefits of Wellhead Protection. Case Studies: Dayton, Ohio; Xenia, Ohio; and Pekin, Illinois

Job, C. A., Environmental Protection Agency, USA; Oct. 27, 1995; 13p; In English

Report No.(s): PB96-188305; EPA/813/B-95/004; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Business participation is a critical factor for three successful local wellhead and ground water protection programs in Dayton and Xenia, Ohio and Pekin, Illinois. They offer three different wellhead and ground water protection models but show common themes for business involvement and benefits. Bottom-line benefits highlighted by several companies include: process changes that saved operating costs not previously anticipated; maintaining water quality that keep industrial water treatment costs down; and knowing the exact storage location of chemicals which keep emergency response costs down and allowed better management of existing chemical stocks. All companies indicated that being within the WellHead Protection Area (WHPA) caused them to be conscious of chemical use and thereby reduced liability from releases through better chemical management. Early involvement by business minimized local regulatory burden and promoted education and protective activities at the same time.

NTIS

Wells; Ground Water; Drinking; Beneficiation; Management Systems

19980016672 Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC USA

National Emission Standards for Hazardous Air Pollutants (NESHAP) for the Printing and Publishing Industry: Background Information for Promulgated Standards *Final Report*

May 1996; 83p; In English

Contract(s)/Grant(s): EPA-68-D1-0118

Report No.(s): PB96-178850; EPA/453/R-96/005B; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The types of printing covered in this rule are publication rotogravure, product and packaging rotogravure and wideweb flexography. This document presents background information for the promulgated rule including changes made to the rule since proposal, a summary of public comments received and EPA's response to those comments and a summary of the National impacts of the rule.

NTIS

Air Pollution; Exhaust Emission; Exhaust Gases; Pollution Control

19980016675 NERAC, Inc., Tolland, CT USA

Chemical Analysis of Aerosols and Airborne Particulates. (Latest Citations from the NTIS Bibliographic Database)

Nov. 1995; In English; Page count unavailable.

Report No.(s): PB96-855317; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning techniques and equipment for the chemical analysis of aerosols and airborne particulate matter. Topics include studies of polycyclic aromatic hydrocarbons, sulfur and nitrogen compounds, and flue gas particulates by x ray analyses, gas chromatography, and infrared or mass spectroscopy. Chemical composition and concentration analyses performed in specific areas are presented. Citations referencing sampling techniques and particle size analysis are not included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Aerosols; Particulates; Chemical Analysis; Spectroscopic Analysis

19980016682 Environmental Protection Agency, Office of Water, Washington, DC USA

Tribal Wellhead Protection Demonstration Projects

Jul. 1995; 141p; In English; Portions of this document are not fully legible

Report No.(s): PB96-188313; EPA/813/R-95/001; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Preventing contamination is the key to keeping ground water supplies safe. Once a drinking water supply becomes contaminated, a tribe is faced with the difficult and costly task of installing treatment facilities or locating an alternative source. Wellhead Protection provides the tribes with an opportunity to protect their drinking water supplies through local community planning. The case studies described herein illustrate Tribal Wellhead Protection activities and highlight several concerns Tribes may have in implementing Wellhead Protection. These concerns include: Ground water recharge or wellhead protection areas that are located outside the boundaries of Tribal reservations; Intimate relationship between ground and surface water within the reservation; Difficulties in implementing or enforcing a program in the absence of a Tribal judicial body. The case study details should be useful in assisting Tribes to develop a Wellhead Protection Program under the Safe Drinking Water Act that is tailored to their unique set of circumstances. Case studies of successful Tribal Wellhead Programs may include elements that are adaptable to other Tribal Programs.

NTIS

Wells; American Indians; Drinking; Contamination

19980016687 Environmental Protection Agency, Office of Water, Washington, DC USA

Applicability of Wellhead Protection Area Delineation to Domestic Wells: A Case Study

Ginsberg, M., Environmental Protection Agency, USA; Sep. 1995; 19p; In English

Report No.(s): PB96-188297; EPA/813/B-95/007; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Wellhead protection for a community supplied by numerous private wells requires a different approach than that for wellhead protection of PWS wells. Before developing a private-wellhead protection plan, a community should consider its protection goals and determine if a wellhead protection program will help meet them. The document presents one such plan and its development.

NTIS

Wells; Planning; Protection; Drinking; Water Resources

19980016695 Forest Service, Fort Collins, CO USA

User's Guide for the CALPUFF Dispersion Model Final Report

Jul. 1995; 340p; In English

Report No.(s): PB96-144258; EPA/454/B-95/006; No Copyright; Avail: CASI; A15, Hardcopy; A03, Microfiche

This report describes the CALPUFF dispersion model and associated processing programs. The CALPUFF model described in this report reflect improvements to the model including (1) new modules to treat buoyant rise and dispersion from area sources (such as forest fires), buoyant line sources, and volume sources, (2) an improved treatment of complex terrain, (3) additional model

switches to facilitate its use in regulatory applications, (4) an enhanced treatment of wind shear through puff splitting, and (4) an optional PC-based GUI. CALPUFF has been coupled to the Emissions Production Model (EPM) developed by the Forest Service through an interface processor. EPM provides time-dependent emissions and heat release data for use in modeling controlled burns and wildfires.

NTIS

Mathematical Models; Air Pollution; User Manuals (Computer Programs); LORAN

19980016699 NERAC, Inc., Tolland, CT USA

Mercury Air Pollution: Sources and Control. (Latest Citations from the Energy Science and Technology Database)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-856042; Copyright Waived; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)); US Sales Only, Microfiche

The bibliography contains citations concerning sources and control of mercury as an air pollutant. Citations discuss pollution derived from incinerators, boilers, combustors, paints, mines, chemical spills, and paper industry effluents. Articles address pollution control technology such as filtration, absorption, source reduction, and waste minimization. Other areas of discussion include quantitative source estimation, analysis, toxicity, and environmental fate of mercury air pollution. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Air Pollution; Mercury (Metal); Incinerators

19980016737 Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC USA

Mercury Study Report to Congress, Volume 5, An Ecological Assessment of Anthropogenic Mercury Emissions in the USA. SAB Review Draft

Nichols, J. W., Environmental Protection Agency, USA; Jun. 1996; 178p; In English

Report No.(s): PB96-184668; EPA/452/R-96/001E; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

In this volume of the draft Mercury Study Report to Congress, an ecological assessment for anthropogenic mercury emissions is developed. The assessment follows the U.S. EPA Framework for Ecological Assessment: problem formulation; presentation of a conceptual model describing airborne mercury accumulation in aquatic biota, biomagnification in the aquatic food chain; and analysis of exposure of wildlife species to methylmercury through consumption of fish and shellfish. Exposures of wildlife species to methylmercury through the aquatic food chain are compared with toxicity data calculated in the development of criteria for the protection of fish-eating avian and mammalian wildlife. Descriptions of mercury impacts on biota are provided in the problem formulation chapter. Estimates are provided of mercury deposition on a local scale in areas near emissions point sources. The distributions of selected fish-consuming wildlife species are overlaid with predicted high mercury areas of high concern (e.g., areas with low-pH surface water) and compared with predicted deposition of anthropogenic mercury emissions.

NTIS

Congressional Reports; Mercury (Metal); Ecology; Wildlife; Air Pollution; Pollution Control

19980016738 Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC USA

Mercury Study Report to Congress, Volume 2, An Inventory of Anthropogenic Mercury Emissions in the USA. SAB Review Draft

Keating, M. H., Environmental Protection Agency, USA; Jun. 1996; 193p; In English

Report No.(s): PB96-184635; EPA/452/R-96/001B; No Copyright; Avail: CASI; A09, Hardcopy; A03, Microfiche

The volume of the draft Mercury Study Report to Congress describes mercury emissions from anthropogenic emissions summary estimates National mercury emissions rates by source category for area and point sources including combustion, manufacturing and miscellaneous point sources. Combustion point sources that dominate anthropogenic emissions are these: medical waste incineration, municipal waste combustion, utility boilers, and commercial/industrial boilers. National emission estimates are based on data from a 1990-1993 time-frame. Within the USA, numerous industrial and manufacturing processes contribute mercury emissions to the atmosphere. Sources of uncertainty and variability in these emissions categories are described in this volume. Data needed to improve these estimates are described in this volume.

NTIS

Mercury (Metal); Air Pollution; Emission; Experimentation

19980016746 GEOMET Technologies, Inc., Germantown, MD USA

Indoor Air Quality Study in Agency Building Two, Empire State Plaza, Albany, New York Final Report

Nov. 1992; 42p; In English

Report No.(s): PB96-190558; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report describes the results of an indoor air quality study in Agency Building Two at the Empire State Plaza in Albany, New York. The objectives were to perform direct monitoring of indoor air pollutants and to conduct a survey of environmental perceptions by building occupants in the 20-story office buildings. The monitoring included measurements of thermal comfort (temperature and relative humidity) and common indoor pollutants (carbon dioxide, formaldehyde, respirable particles, and microorganisms). Tests were conducted for two weeks during peak summer and winter seasons. Indoor conditions were evaluated under minimum outdoor air ventilation rates of 20 cfm and 35 cfm.

NTIS

Indoor Air Pollution; Air Quality; Buildings

19980016747 PRC Environmental Management, Inc., Kansas City, KS USA

Clor-N-SOII PCB Test Kit, Dexsil Corp. Innovative Technology Evaluation Report

Hess, E., PRC Environmental Management, Inc., USA; Hamilton, D., PRC Environmental Management, Inc., USA; Aug. 1995; 60p; In English

Report No.(s): PB96-130687; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This ITER summarizes the procedures used to demonstrate the Clor-N-SOII PCB Test Kit and L2000 PCB/Chloride Analyzer. It discusses the results of the demonstration and evaluates the effectiveness and possible uses of these two innovative technologies at various hazardous waste sites. The primary goal of the demonstration was to evaluate these technologies and to provide Superfund decisionmakers with adequate reliable information on their performance and cost effectiveness.

NTIS

Polychlorinated Biphenyls; Cost Effectiveness; Evaluation; Technologies; SOIs; Chemical Analysis

19980016765 Booz-Allen and Hamilton, Inc., Bethesda, MD USA

RCRA/UST, Superfund, and EPCRA Hotline Training Module. Introduction to Accidental Release Prevention Program (CAA Section 112(r); 40 CFR Part 68). Updated as of November 1995

Mar. 1996; 17p; In English

Report No.(s): PB96-780648; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The module explains the purpose of Section 112(r) of the Clean Air Act and how it relates to the goals and requirements of the Emergency Planning and Community Right-to-know Act (EPCRA). It describes the promulgation of the list of regulated substances. It discusses the risk management planning requirements and explains how the risk management rule is being promulgated. It identifies the presidential review and describes the similarity of the risk management program to the occupational health and safety administration's process safety management standard.

NTIS

Air Quality; Management Planning; Prevention; Safety Management

19980016773 Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC USA

Guidance for Siting Ambient Air Monitors Around Stationary Lead Sources

Byrd, L., Environmental Protection Agency, USA; Atkinson, D., Environmental Protection Agency, USA; Lee, R., Environmental Protection Agency, USA; Coulter, T., Environmental Protection Agency, USA; Aug. 1997; 79p; In English

Report No.(s): PB97-208094; EPA/454/R-92/009; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This document provided technical guidance to air monitoring agencies on how to determine the network design for measuring lead air pollution concentrations emitted from stationary lead sources.

NTIS

Air Pollution; Air Sampling; Environmental Monitoring; Lead (Metal); Models

19980016790 Texas A&M Univ., College Station, TX USA

Development of Gridded Mobile Source Emission Estimates for Jefferson, Orange and Hardin Counties FY93, FY96, and FY99 in Support of the COAST Project Final Report, Apr. 1992 - Aug. 1995

Knowles, W. E., Texas A&M Univ., USA; Dresser, G. B., Texas A&M Univ., USA; Nov. 1995; 91p; In English

Report No.(s): PB96-190954; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This report documents the methodology used to develop the Jefferson, Orange, and Hardin Counties gridded mobile source emissions inventories. Included in the report are an overview of the emission estimation methodology and the 24-hour traffic assignments used in the analyses; the methods used to estimate the seasonally adjusted time-of-day vehicle miles of travel and associated operating speeds; the estimation of the emission rates using the EPA's MOBILE5a program; and an outline of the method used to develop the emission estimates using the MOBILE5a emission rates. The appendices present the emissions developed for the emissions inventory. These emission inventories were developed in support of the Coastal Oxidant Assessment of Southeast Texas Project (COAST); a large-scale study of ozone formation being conducted by the Texas Natural Resource Conservation Commission (TNRCC).

NTIS

Air Pollution; Pollution Monitoring; Exhaust Emission; Environment Effects; Automobiles

19980016798 Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC USA
Mercury Study Report to Congress, Volume 4, Health Effects of Mercury and Mercury Compounds. SAB Review Draft
Schoeny, R., Environmental Protection Agency, USA; Jun. 1996; 328p; In English
Report No.(s): PB96-184650; EPA/452/R-96/001D; No Copyright; Avail: CASI; A15, Hardcopy; A03, Microfiche

This volume of the draft Mercury Study Report to Congress summarizes the available information on human health effects and animal data for hazard identification and dose-response assessment for three forms of mercury: elemental mercury, mercury chloride (inorganic mercury), and methylmercury (organic mercury). Effects are summarized by endpoint. The risk assessment evaluates carcinogenicity, mutagenicity, developmental toxicity and general systemic toxicity of these chemical species of mercury. Toxicokinetics (absorption, distribution, metabolism and excretion) are described for each of the three mercury species. PBPK models are described, but not applied in risk assessment. Reference doses are calculated for inorganic and methylmercury; a reference concentration for inhaled elemental mercury is provided. A quantitative analysis of factors contributing to variability and uncertainty in the methylmercury R&D is provided in an appendix. Interactions and sensitive populations are described.

NTIS

Mercury (Metal); Toxicity; Air Pollution; Dosage; Hazards; Public Health

19980016803 Southern Research Inst., Research Triangle Park, NC USA
Evaluation of Pollution Prevention Opportunities for Mold Release Agents Final Report, May 1994 - Dec. 1995
Lanning, J. S., Southern Research Inst., USA; Cavender, K. A., Southern Research Inst., USA; Jun. 1996; 61p; In English
Report No.(s): PB96-187745; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The report gives results of an assessment of the processes, materials, installation practices, and emission characteristics associated with the application of mold release agents (MRAs). Volatile organic compound (VOC) emissions of MRAs were estimated to be 126,000 tons (114,000 tons) per year. The study also found that polyurethane molding operations accounted for a significant portion of the total MRA emissions (about 25%) and that automobile seat and other foam molding operations accounting for most of the emissions associated with the polyurethane category. Several pollution prevention alternatives were identified for conventional MRA usage in the polyurethane foaming industry. An initial assessment of each identified technology was performed. The Solvent Emission Reduction Technology (SERT) process was selected for further evaluation.

NTIS

Mold; Rust Fungi; Organic Compounds; Pollution Control; Polyurethane Resins

19980016804 Pacific Environmental Services, Inc., Research Triangle Park, NC USA
User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, Volume 1, User Instructions
Sep. 1995; 313p; In English
Report No.(s): PB95-222741; No Copyright; Avail: CASI; A14, Hardcopy; A03, Microfiche

This volume of the User's Guide for the Industrial Source Complex (ISC3) Dispersion Model provides user instructions for setting up and running the ISC3 model. The ISC3 User's Guide has been revised as part of a larger effort to incorporate (1) the numerical integration method for the area source algorithm, (2) a revised dry deposition algorithm, (3) the addition of a wet deposition algorithm, and (4) the addition of a pit retention algorithm.

NTIS

Air Pollution; Environment Protection; Environmental Quality

19980016811 Environmental Protection Agency, Cincinnati, OH USA
Bioremediation of Hazardous Wastes. Research, Development, and Field Evaluations, 1993
Kremer, F., Environmental Protection Agency, USA; Sep. 1993; 144p; In English

Report No.(s): PB96-130703; EPA/600/R-94/160; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The 1993 Symposium on Bioremediation of Hazardous Wastes, sixth annual meeting for the presentation of research conducted by EPA's Biosystems Technology Development Program (BTDP) and by affiliated Hazardous Substance Research Centers (HSRCs). The document contains abstracts of recent research projects, ranging in scope from molecular biology in the laboratory to cleanup evaluations in the field. 32 papers and numerous posters presented at the symposium are organized into seven program areas: Bioremediation Field Initiative, Performance Evaluation, Field Research, Pilot-Scale Research, Process Research, Development of Computer-Based Assessment Systems, and Hazardous Substance Research Centers. The proceedings also contain a brief synopsis of introductory remarks made by opening speakers.

NTIS

Hazardous Materials; Pollution Control; Waste Treatment; Conferences; Water Pollution; Evaluation

19980016822 Environmental Protection Agency, Cincinnati, OH USA

Bioremediation of Hazardous Wastes. Research, Development, and Field Evaluations, 1994

Kremer, F., Environmental Protection Agency, USA; Sep. 1994; 205p; In English

Report No.(s): PB96-130711; EPA/600/R-94/161; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

The 1994 Symposium on Bioremediation of Hazardous Wastes, was the seventh annual meeting for the presentation of research conducted by EPA's Biosystems Technology Development Program (BTDP) and by affiliated Hazardous Substance Research Centers (HSRCs). The document contains abstracts of recent research projects ranging in scope from laboratory application to cleanup evaluations in the field. 41 papers and numerous posters presented at the symposium are organized into six program areas: Bioremediation Field Initiative, Performance Evaluation, Field Research, Pilot-Scale Research, Process Research, and Hazardous Substance Research Centers. The proceedings also contain a brief synopsis of introductory remarks made by opening speakers.

NTIS

Hazardous Materials; Pollution Control; Waste Treatment; Conferences; Hazardous Wastes; Abstracts; Water Pollution; Evaluation

19980016824 Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC USA

Mercury Study Report to Congress, Volume 1, Executive Summary. SAB Review Draft

Keating, M. H., Environmental Protection Agency, USA; Mahaffey, K. R., Environmental Protection Agency, USA; Schoeny, R., Environmental Protection Agency, USA; Jun. 1996; 115p; In English

Report No.(s): PB96-184627; EPA/452/R-96/001A; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This volume summarizes findings of the draft Mercury Study Report to Congress required of U.S. EPA under the Clean Air Act Amendments of 1990. The summary volume provides an overview of the Report's findings on properties and industrial uses of mercury; analysis of atmospheric releases, process, fate and transport of mercury; and analysis of potential exposure pathways of wildlife and humans. The summary volume focuses on potential adverse health effects of methylmercury exposure to humans and wildlife from consumption of fish and shellfish. Management alternatives including the following possible control strategies were reviewed: pollution prevention measures, product substitution and process modification; materials separation; and flue gas treatment technologies. Costs of various control measures and research needs were presented. The volume of the draft Report also includes scientific peer-review comments as a supplement.

NTIS

Mercury (Metal); Toxicity; Congressional Reports; Pollution Control; Air Pollution; Environment Pollution; Health

19980016825 Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC USA

Mercury Study Report to Congress, Volume 3, An Assessment of Exposure from Anthropogenic Mercury Emissions in the USA. SAB Review Draft

Rice, G. E., Environmental Protection Agency, USA; Jun. 1996; 575p; In English

Report No.(s): PB96-184643; EPA/452/R-96/001C; No Copyright; Avail: CASI; A24, Hardcopy; A04, Microfiche

This volume of the draft Report presents an assessment of exposure to emitted mercury from both inhalation and ingestion routes. Modeling includes long-range transport analysis (Regional Lagrangian Model of Air Pollution) and exposure assessment of local deposition of mercury from anthropogenic emissions sources (COMPDEP) aquatic and terrestrial fate models and exposure models presented originally in Methodology for Assessing Health Risks Associated with Indirect Exposure to Combustor Emissions. A parallel assessment of mercury exposure from fish and shellfish for the general U.S. population and for subpopulations anticipated to ingest higher quantities of fish (e.g., anglers, members of some Native American tribes, and some ethnic groups) was conducted based on dietary survey data. Comparison are made of dietary intake of fish and of methylmercury for

humans and for various species of fish-eating birds and mammals. Specific information on the analysis is presented in the Appendices; in particular details of the models, descriptions of model parameters, justifications and details of human fish consumption analyses.

NTIS

Mercury (Metal); Congressional Reports; Models; Environment Pollution; Air Pollution

19980016826 Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC USA
Mercury Study Report to Congress, Volume 6, Characterization of Human Health and Wildlife Risks from Anthropogenic Mercury Emissions in the USA. SAB Review Draft

Mahaffey, K. R., Environmental Protection Agency, USA; Schoeny, R., Environmental Protection Agency, USA; Rice, G. E., Environmental Protection Agency, USA; Keating, M. H., Environmental Protection Agency, USA; Jun. 1996; 157p; In English
Report No.(s): PB96-184676; EPA/452/R-96/001F; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

The volume of the draft Mercury Study Report to Congress characterizes risk for mercury emitted to the environment from anthropogenic sources. The characterization volume describes human and wildlife health effects of mercury exposure with accompanying analysis of uncertainty in quantitative risk estimates. Exposure pathways for selected human and wildlife populations to mercury are considered, again accompanied by a discussion of uncertainty. The size of the fish-eating U.S. population and quantities of mercury consumed in fish are estimated, as are the number of maternal-fetal pairs for whom maternal fish consumption is projected to exceed levels identified to be of concern. Literature reports of mercury concentrations in tissues of fish-eating wildlife species are presented. The sizes of selected wildlife populations identified as potentially exposed to quantities of methylmercury associated with adverse health effects are estimated. An overall characterization of risk of mercury to human sub-populations and selected fish-consuming wildlife species is developed.

NTIS

Mercury (Metal); Exposure; Health; Populations

19980016858 Battelle Memorial Inst., Columbus, OH USA

Progress on Nitrogen Oxides Measurement Methods for Indoor Air Applications, Jul. 1991 - Oct. 1995

Spicer, C. W., Battelle Memorial Inst., USA; Oct. 1995; 55p; In English
Report No.(s): PB96-140082; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Nitrogen dioxide (NO₂) is a toxic air pollutant that is found both outdoors and indoors. One source of NO₂ in indoor environments is unvented natural gas combustion. Because people spend a large fraction of their time indoors, indoor exposure to NO₂ is a very significant contributor to total NO₂ exposure. One means of estimating indoor exposure to NO₂ is to measure indoor NO₂ concentrations. This study has examined four passive sampling approaches and three continuous monitoring methods that are used for indoor NO₂ measurements. The accuracy, precision and linearity of the methods were evaluated by exposing each measurement system to a wide range of known NO₂ concentrations. The selectivity (i.e. degree of interference) of the methods was evaluated by challenging each method with humidified air containing potential interfering gases.

NTIS

Air Pollution; Natural Gas; Nitrogen Dioxide; Nitrogen Oxides; Toxicity

19980016860 Louisiana State Univ., Coastal Marine Inst., Baton Rouge, LA USA

Outer Continental Shelf Issues: Central Gulf of Mexico Final Report

Gramling, R., Louisiana State Univ., USA; Brabant, S., Louisiana State Univ., USA; Forsyth, C., Louisiana State Univ., USA; Palmer, C. E., Louisiana State Univ., USA; Aug. 1995; 84p; In English
Report No.(s): PB96-143235; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This report summarizes the research effort and findings of an investigation of the issues associated with Outer Continental Shelf (OCS) oil and gas activities in the Central Gulf of Mexico. Stakeholders assessed for the delineation of the issues associated with OCS oil and gas activities ranged across the offshore oil and gas industry; the offshore support sector; other direct and indirect coastal users; stakeholders that benefited from economic growth in general; concerned citizen groups; and public and governmental organizations.

NTIS

Gulf of Mexico; Offshore Energy Sources; Oils; Organizations; Crude Oil; Natural Gas

19980016869 Pacific Environmental Services, Inc., Research Triangle Park, NC USA

Air/Superfund National Technical Guidance Study Series: Air/Superfund Guide to Pollutant Toxicity, March 1996 Final Report

Mar. 1996; 157p; In English

Report No.(s): PB96-162490; EPA-451/R-96-006; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This report compiles a list of existing health-related values (inhalation equipment only) for 34 individual pollutants (volatile organic compounds (VOCs), metals pesticides, and heavy organic compounds). The data gathering effort involved the following for each pollutant identified: searching both scientific literature and State regulations for all health related concentrations; preparing a listing of each concentration or limit; providing definitions of each of the common values listed; and preparing a listing of compound synonyms and health effect descriptions. This report also contains the inhalation exposure limits that were identified for each of the 34 pollutants ranked by exposure limit.

NTIS

Contaminants; Organic Compounds; Respiration; Toxicity

19980016872 Dynamac Corp., Corvallis, OR USA

Database Management Plan for the Oregon Wetland Study

Ernst, T. L., Dynamac Corp., USA; Jun. 1997; 65p; In English

Report No.(s): PB97-180848; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The purpose of the Plan is to outline and convey a strategy for managing the data files from the 1987 Oregon Pilot Study (OPS), 1993 Oregon Wetland Study (OWS), and Phase 2 of the OWS. The data management strategy emphasizes data security, integrity, and documentation for a functional database that is easily accessible to the OWS staff.

NTIS

Data Base Management Systems; Wetlands; Oregon; Data Bases

19980016881 Environmental Protection Agency, National Risk Management Research Lab., Cincinnati, OH USA

Superfund Innovative Technology Evaluation Program: Technology Profiles, Ninth Edition

Dec. 1996; 542p; In English

Report No.(s): PB97-187819; EPA/540/R-97/502; No Copyright; Avail: CASI; A23, Hardcopy; A04, Microfiche

The Superfund Innovative Technology Evaluation (SITE) Program, now in its eleventh year, is an integral part of EPA's research into alternative cleanup methods for hazardous waste sites around the nation. The document, prepared between August 1996 and December 1996, is intended as a reference guide for those interested in technologies participating in the SITE Demonstration, Emerging Technology, and Characterization and Monitoring Programs. The two-page profiles are organized into two sections for each program, completed and ongoing projects, and are presented in alphabetical order by developer name. Reference tables for SITE Program participants precede the sections and contain EPA and developer contacts. Each technology profile contains: (1) a technology developer and process name; (2) a technology description, including a schematic diagram or photograph of the process; (3) a discussion of waste applicability; (4) a project status report; and (5) EPA project manager and technology developer contacts. The profiles also include summaries of demonstration results, if available. A Trade Name Index and Applicability Index and are also included in the back of the document. The Applicability Index is organized by 11 media categories, 19 waste categories, and 14 technology type categories.

NTIS

Hazardous Materials; Environment Pollution; Pollution Control; Pollution Monitoring; Waste Treatment

19980016887 Environmental Protection Agency, Office of Water, Washington, DC USA

Protecting the Great Lakes: The Costs and Benefits of Reducing Toxic Pollution in Three Communities

Nov. 1995; 10p; In English

Report No.(s): PB96-164660; EPA/820/F-95/004; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

EPA recently issued common-sense guidelines to reduce toxic pollution in the Great Lakes and ensure protection for the environment and people living in the area. Will this protection come at a reasonable cost. Results from a detailed evaluation of impacts for three communities in the region reveal that public health and environmental benefits will outweigh the costs of achieving those reductions. The three communities evaluated were the Fox River near Green Bay, Wisconsin; the Saginaw River near Bay City, Michigan; and the Black River near Cleveland, Ohio. Information on the case study results is provided.

NTIS

Protection; Great Lakes (North America); Pollution Monitoring

19980016892 DGA, Inc., Ventura, CA USA

Carbonyl Products of the Ozone-Alkene Reaction *Final Report*

Grosjean, D., DGA, Inc., USA; Grosjean, E., DGA, Inc., USA; Oct. 1995; 64p; In English
Report No.(s): PB96-164967; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

DGA, Inc. carried out two phases of laboratory studies of the ozone-alkene reaction--which is of critical importance in atmospheric chemistry. The first phase involved the measurements of carbonyl and carboxylic acid products in the reaction of ozone with simple alkenes. The second phase included measurements of carbonyl products in the reaction of ozone with higher molecular weight alkenes. This report describes the methods, results, and conclusions of the second phase of this work.

NTIS

Atmospheric Chemistry; Carbonyl Compounds; Air Quality; Laboratories; Experimentation; Chemical Analysis

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism. For space radiation see 93 Space Radiation.

19980012519 Geological Survey, Denver, CO USA

Geologic Processes at the Land Surface

Wilshire, H. G., Geological Survey, USA; Howard, K. A., Geological Survey, USA; Wentworth, C. M., Geological Survey, USA; Gibbons, H., Geological Survey, USA; 1996; 48p; In English

Report No.(s): PB96-177837; USGS/Bull-2149; LC-95-41143; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Contents include the following: Introduction; Land and People at Risk; Research Can Help; Processes: Principles, Rates, and Sensitivity to Change; Knowledge Gaps; Thresholds and Irreversible Change; Techniques; Knowledge Gained from Extreme Events; Long-Term Monitoring; Large-Scale Experimentation; Dating Geologically Young Events; Cartographic and Satellite-Based Aids; Conclusion.

NTIS

Chronology; Earth Surface; Mapping

19980012544 NERAC, Inc., Tolland, CT USA

Seismic Waves: Signal Processing. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English

Report No.(s): PB96-859921; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning techniques and applications of seismic signal processing. Seismic data analysis, detection, discrimination, and source identification are discussed. Design, automation, and evaluation of seismic signal processing systems are presented. Applications include detection and analysis systems in ocean technology, mining industry, earth science, and military science. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Seismic Waves; Signal Processing

19980014107 Army Research Lab., Information Science and Technology Directorate, Adelphi, MD USA

Analytical Expression for the Decay History of an Atmospheric Turbulence *Final Report, Jul. 1996 - Feb. 1997*

Auvermann, Harry J., Army Research Lab., USA; Oct. 1997; 34p; In English

Report No.(s): AD-A331085; ARL-TR-1315; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This investigation was undertaken as a part of a larger effort to determine the implications of using coherent turbulent structures or turbules to calculate acoustic scattering from turbulent media, a process that has been suggested as a possible non-line-of-sight means of detecting enemy assets on the battlefield. I present an analytical solution to a correlate of the incompressible Navier-Stokes equation. The correlate equation is for the enstrophy, the square of the vorticity. The solution is an expression for the time history of the enstrophy for a particular choice of the initial velocity distribution.

DTIC

Atmospheric Physics; Acoustic Scattering; Incompressible Flow; Turbulent Flow

19980015254 Georgia Tech Research Inst., Electro-Optics, Environment, and Materials Lab., Atlanta, GA USA

Laboratory Investigations of Stratospheric Halogen Chemistry Final Report, 1 Jan. 1987 - 31 Dec. 1996

Wine, Paul H., Georgia Tech Research Inst., USA; Nicovich, J. Michael, Georgia Tech Research Inst., USA; Stickel, Robert E., Georgia Tech Research Inst., USA; Hynes, Anthony J., Georgia Tech Research Inst., USA; Apr. 09, 1997; 280p; In English; Also announced as 19980015255 through 19980015274

Contract(s)/Grant(s): NAGw-1001; GTRI Proj. A-4698

Report No.(s): NASA-CR-204072; NAS 1.26:204072; Copyright Waived (NASA); Avail: CASI; A13, Hardcopy; A03, Microfiche

A final report for the NASA-supported project on laboratory investigations of stratospheric halogen chemistry is presented. In recent years, this project has focused on three areas of research: (1) kinetic, mechanistic, and thermochemical studies of reactions which produce weakly bound chemical species of atmospheric interest; (2) development of flash photolysis schemes for studying radical-radical reactions of stratospheric interest; and (3) photochemistry studies of interest for understanding stratospheric chemistry. The first section of this paper contains a discussion of work which has not yet been published. All subsequent chapters contain reprints of published papers that acknowledge support from this grant.

Derived from text

Atmospheric Chemistry; Photochemical Reactions; Halogens; Stratosphere; Photolysis; Trace Elements; Photodissociation; Thermochemistry

19980015287 Washington Univ., Dept. of Geological Sciences, Seattle, WA USA

Alluvial Fan Evolution in the Western Great Basin

Gillespie, Alan R., Washington Univ., USA; Adams, John B., Washington Univ., USA; Smith, Milton O., Washington Univ., USA; Weeks, Robin, Washington Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 58-65; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The progress and future plans regarding the following objectives are presented: (1) Describe systematic morphologic changes with surface age in terms of multiparameter radar backscatter for dated chronosequences on alluvial fans at one or two sites in the Western Great Basin. Compare these changes to chemical weathering patterns observed for the same fans using visible/near-infrared (VNIR) and thermal infrared (TIR) images; (2) Construct a depositional and weathering history for the studied alluvial fans based on SAR, other images, and field investigations; use this to constrain paleoclimatic interpretations for the Great Basin. Use project as prototype for paleoclimate study of entire Great Basin or other geomorphic provinces, where multiparameter SAR data can be acquired regionally; and (3) Test the application of spectral mixing analysis on multiparameter SAR images of alluvial fans in arid and semiarid regions. Define radar endmembers (from the spectral mixing analysis) physically, in terms of Bragg scattering, volume scattering, specular and corner reflectors, dielectric constant, etc. Develop and test mixing models for comparative analysis of images spanning multiple spectral regions.

Derived from text

Geomorphology; Great Basin (US); Infrared Imagery; Synthetic Aperture Radar; Fans (Landforms); Radar Imagery; Radar Scattering

19980015289 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

Development of a Technique to Relate Aeolian Roughness to Radar Backscatter using Multiparameter SIR-C Data

Greeley, Ronald, Arizona State Univ., USA; Blumberg, Dan, Arizona State Univ., USA; Dobrovolskis, A., NASA Ames Research Center, USA; Iverson, James, Iowa State Univ. of Science and Technology, USA; Lancaster, Nicholas, Desert Research Inst., USA; White, Bruce, California Univ., USA; Rasmussen, Keld, Aarhus Univ., Denmark; Saunders, Stephen, Jet Propulsion Lab., California Inst. of Tech., USA; vanZyl, Jakob, Jet Propulsion Lab., California Inst. of Tech., USA; Wall, Stephen, Jet Propulsion Lab., California Inst. of Tech., USA; Zebker, Howard, Jet Propulsion Lab., California Inst. of Tech., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 68-70; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress and future plans for the following objectives are presented: (1) To develop a technique to obtain values of aeolian roughness for geologic surfaces from values of surface roughness determined from calibrated L- and C-band, like- and cross-polarized, multiple incidence angle radar data from SIR-C; (2) to define the optimal combination of radar parameters from which aeolian roughness can be derived; and (3) to gain an understanding of the physical processes behind the empirical relationship.

Derived from text

Radar Data; Shuttle Imaging Radar; Surface Roughness

19980015290 Academia Sinica, Inst. of Remote Sensing Applications, Beijing, China

Multi-Parameter SIR-C/X-SAR for Geoscience Study in China

Huadong, Guo, Academia Sinica, China; Chao, Wang, Academia Sinica, China; Yun, Shao, Academia Sinica, China; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 71-72; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress made on the following objectives is presented: (1) Establish the backscatter models for the typical targets at the land surface and study the penetration phenomena; (2) Develop the techniques for multi-frequency and multi-polarization SAR image processing and specific geoscience information extraction; (3) Study the geology and mineralization both in arid and subtropical regions, the archaeology and other geoscientific fields with the shuttle imaging radar; and (4) Develop interferometric and polarimetric SAR data analysis methods and evaluate their roles in geoscience study.

Derived from text

Image Processing; Shuttle Imaging Radar; Data Acquisition; Synthetic Aperture Radar; Image Analysis; Radar Imagery

19980015298 Geological Survey, Flagstaff, AZ USA

Paleodrainages of the Sahara, SIR-C

McCauley, John, Geological Survey, USA; Schaber, Gerald, Geological Survey, USA; Breed, Carol, Geological Survey, USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 108-110; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress, future plans and publications regarding the following objectives are presented: (1) Use SIR-C/X-SAR data in a synoptic mode with other remotely sensed data, field, and cartographic data to map relic Cenozoic drainage systems across the Sahara from the Red Sea Hills, Egypt, to the Chad Basin and Atlantic Ocean; (2) Demonstrate applicability of SIR data, used with LANDSAT, SPOT and high-altitude photographic data, as a new, cost-effective remote geophysical tool for exploration geology; (3) Produce a major report on the distribution of paleodrainages in the Sahara, their relations to the basic tectonic elements of North Africa (basins and swells), and their economic potential.

Derived from text

Mapping; Remote Sensing; Shuttle Imaging Radar; Drainage Patterns; Radar Data; Synthetic Aperture Radar

19980015302 Hawaii Univ., Planetary Geosciences Div., Honolulu, HI USA

Eruptive Styles of Basaltic Shield Volcanoes from Shuttle Imaging Radar-C (SIR-C) and X-SAR Data

Mouginis-Mark, Peter J., Hawaii Univ., USA; Kaupp, V. H., Arkansas Univ., USA; MacDonald, H. C., Arkansas Univ., USA; Waite, W. P., Arkansas Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 128-136; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Progress, significant results and future plans are discussed in relation to the following objectives: (1) to provide a comprehensive understanding of the distribution of volcanic materials on classic examples of basaltic shield volcanoes in Hawaii, Reunion Island (Indian Ocean) and Galapagos (Eastern Pacific); and (2) Interpret the preserved eruptive history of each volcano, draw contrasts between each test site in terms of the role of the tectonic setting on basaltic volcanism, and make inferences about the internal structure of the volcano and its magma chamber.

Derived from text

Imaging Techniques; Shuttle Imaging Radar; Volcanoes; Volcanology; Radar Data; Synthetic Aperture Radar; Radar Imagery

19980015310 Texas Univ., Center for Lithographic Studies, Dallas, TX USA

SIR-C Studies of the Precambrian Hamisana and Nakasib Structures, NE Sudan, in Arid Regions of Low Relief and in the Subsurface

Stern, Robert J., Texas Univ., USA; Dixon, Timothy H., Jet Propulsion Lab., California Inst. of Tech., USA; Nielson, Kent C., Texas Univ., USA; Sultan, Mohammed, Washington Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 170-178; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Progress, significant results, and future plans regarding the following project objectives are presented: (a) Develop techniques for optimizing structural analysis of basement trends in arid regions with extremely subdued topography and/or thin aeolian cover. b) Apply results of (a) to map the southern extension of the Hamisana Shear Zone and the western extension of Nakasib Suture.

c) Apply results of (b) to constrain the roles of terrane accretion and strike-slip re-organization for late Precambrian crustal evolution in NE Africa.

Derived from text

Arid Lands; Shuttle Imaging Radar; Image Analysis; Landforms; Structural Analysis; Earth Crust; Sahara Desert (Africa); Radar Data; Remote Sensing

19980015318 North Dakota State Univ., Space Studies, Fargo, ND USA

SIR-C Radar Investigations of Volcanism and Tectonism of the Northern Andes

Wood, Charles A., North Dakota State Univ., USA; England, Anthony, Michigan Univ., USA; Hall, Minard, National Polytechnic Inst., Ecuador; Williams, Stanley, Arizona State Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 222-230; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The progress and future plans of the study regarding the following objectives are presented. (1) to increase understanding of the volcano-tectonic history of the Northern Andes of Colombia and Ecuador by testing and extending the volcano-tectonic segmentation model proposed by Hall and Wood (1985); (2) To develop radar models for detecting and mapping pyroclastic and mudflow deposits at Ruiz and other dangerous volcanoes of the Northern Andes; and (3) SIR-C Radar Investigations of Volcanism and Tectonism of the Northern Andes was selected for mission in 1988. We proposed a series of interrelated multi-disciplinary new information to (a) characterize radar roughness, (b) determine the tectonism in a poorly known volcanic arc, and (c) study hazards related to Ruiz volcano, Colombia and other potentially active volcanoes of the Northern Andes. Significant progress was made on each of these tasks, and the eventual arrival of actual SIR-C data has accelerated our research efforts, with the first results now being presented at National meetings.

Derived from text

Andes Mountains (South America); Shuttle Imaging Radar; Volcanology; Tectonics; Radar Imagery; Image Analysis

19980015396 Princeton Univ., Dept. of Geological and Geophysical Sciences, NJ USA

Modes, Rays and Scattering: A Basic Study of Seismic Wave Propagation at Regional Distances Final Report, 1 Dec. 1993 - 30 Nov. 1996

Nolet, Guust, Princeton Univ., USA; Dahlen, F. A., Princeton Univ., USA; Phinney, R. A., Princeton Univ., USA; Feb. 19, 1997; 31p; In English

Contract(s)/Grant(s): F49620-94-1-0077; AF Proj. 2309

Report No.(s): AD-A329685; AFOSR-TR-97-0370; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The objective of this research was to systematically explore the attributes of the wave form Lg and related wave forms which are trapped in the crust. The different theoretical approximations used to characterize or to fully compute regional seismic waves were thoroughly investigated. Empirical classification of the behavior of Lg was achieved through waveform data analyses. The Kennett conjecture that Lg waves can be adequately described by multiple S energy trapped in the crust has been adopted. It has been shown that Lg magnitudes are much more stable than the chaotic behavior of the ray would seem to imply. As a result of recognizing that a large number of caustic are generated as a consequence of the chaotic ray behavior, it was decided that Maslov theory was probably the only suitable technique to deal with the singularity problem. As a result, it has been shown that Maslov synthetics can be used to justify the use of ray density plots as energy plots, which can be used in turn for the calibration of Lg magnitudes. The 3-component array and single station data from the NPE 1993 detonation have been analyzed in order to examine the effects boundary undulations of the crustal wave guide may have on propagation.

DTIC

Wave Propagation; Waveforms; Seismic Waves; Magnitude

19980015638 State Univ. of New York, Albany, NY USA

Observational Case Studies and Diagnostic Analyses of Long-Lived Large-Amplitude Inertia-Gravity Waves Final Report, 15 Oct. 1992 - 14 Oct 1996

Bosart, Lance F., State Univ. of New York, USA; Keyser, Daniel, State Univ. of New York, USA; Dec. 17, 1996; 25p; In English Contract(s)/Grant(s): F49620-93-1-0002

Report No.(s): AD-A329684; SUNY-320-2416-5; AFOSR-TR-97-0419; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

AFOSR-funded research projects have included: (1) completion of a National climatology of large-amplitude inertia-gravity wave (IGW) occurrences, (2) completion of a case study from 15-17 November 1987 of a long-lived convective event that featured a complex interplay between wake-low troughs and IGWs, (3) completion of a case study of the 4 January 1994 large-amplitude

IGW event over the northeastern USA, and (4) ongoing research designed to elicit the environmental structure (horizontal and vertical) of large-amplitude IGWs. The results from (1) reveal that IGWs are favored in interior regions east of the Rockies while avoiding the mountainous western USA. The analysis from (2) shows that rain-cooled air provides the necessary low-level wave duct for IGWs and wake-low troughs to coexist in an organized convective environment. The results from (3) suggest that vigorous subsynoptic-scale ascent can play the role of surrogate convection in allowing IGW organization and amplification provided that the ascent has roots in a prominent low-level wave duct. Preliminary results from (4) reveal that the environment of large-amplitude IGWs is remarkably similar to warm front environments except that the upper-level jet is stronger and the low-level thermal inversion is better defined in the IGW cases.

DTIC

Amplification; Climatology; Convection; Gravity Waves; Temperature Inversions; USA; Warm Fronts

19980016663 Norwegian Defence Research Establishment, Kjeller, Norway

Simulation of Gravity Waves by Spectral Collocation Methods

Andreassen, O., Norwegian Defence Research Establishment, Norway; Jan. 18, 1994; 102p; In English
Report No.(s): PB96-126594; NDRE/Publ-94/00379; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Gravity waves propagating in a stratified environment with a vertically shared horizontal wind are treated by aid of spectral collocation. Wave breaking caused by nonlinear wave-wind interaction, forming a critical layer, is shown to form instabilities which are three dimensional. Compared to a two-dimensional evolution of the wave field, where the release of energy into the third dimension is prevented, the three dimensional behavior differs qualitatively and quantitatively. The wave field is shown to break up much more efficient when expressed in three dimensions. The wave fields are evolved through the breaking phase up to onset of turbulence. A qualitative picture of the evolution of the wave field can be rendered through the vortex field which at an early stage is made up of sheets. At later times these sheets are evolved by the occurring of a static and dynamic instabilities, into thin and elongated tubes, shaped as loops, amplified by vortex-stretching. At a late state, the interaction between the loops, cause them to form a rather randomly oriented and chaotic pattern.

NTIS

Gravity Waves; Spectral Methods; Stretching; Turbulence; Vortices; Wave Interaction

19980016666 Colorado School of Mines, Div. of Engineering, Golden, CO USA

Preliminary Processing of the Lotung LSST Data

Glaser, S. D., Colorado School of Mines, USA; Leeds, A. L., Colorado School of Mines, USA; Mar. 1996; 59p; In English
Report No.(s): PB96-165972; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Possibly the best set of data for earthquake excitation of soils exists for the test site operated by the Electric Power Research Institute (EPRI) and the Taiwan Power Company at Lotung Taiwan. At this site, two locations are instrumented with three-component accelerometers at depths of 47, 17, 11, 6 meters, and at the surface. One array is in the free-field while the other is adjacent to a one-quarter scale nuclear containment vessel. The site is also well instrumented with piezometers at various depths and locations. The report summarizes the data and signal processing that was done to the EPRI Lotung data at the Colorado School of Mines. The over 2000 files were organized into MATLAB experiments by event. The provided acceleration data were carefully double integrated to yield velocity and displacement time history records.

NTIS

Nuclear Power Plants; Data Processing; Earthquakes; SOIL Mapping

19980016690 Geological Survey, Denver, CO USA

Paleomagnetic and Ar-40/Ar-39 Geochronologic Data from Late Proterozoic Mafic Dikes and Sills, Montana and Wyoming

Harlan, S. S., Geological Survey, USA; Geissman, J. W., Geological Survey, USA; Snee, L. W., New Mexico Univ., USA; 1997; 21p; In English

Report No.(s): PB97-197396; USGS-PP-1580; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The authors report paleomagnetic and geochronologic results from two Late Proterozoic mafic dikes exposed in Archean-cored uplifts from northwestern Wyoming and Ar-49/Ar-39 Ar results from a Gabbro sill that intrudes lower sedimentary strata of the Belt Supergroup in western Montana.

NTIS

Paleomagnetism; Data Acquisition; Precambrian Period

47
METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

19980013927 Naval Oceanography Command Center/Joint Typhoon Warning Center, FPO San Francisco, CA USA

1996 Annual Tropical Cyclone Report Annual Report

Dillion, C. P., Naval Oceanography Command Center/Joint Typhoon Warning Center, USA; Jan. 1996; 343p; In English
Contract(s)/Grant(s): N00014-96-1-0744

Report No.(s): AD-A332916; No Copyright; Avail: CASI; A15, Hardcopy; A03, Microfiche

The Annual Tropical Cyclone Report is prepared by the staff of the Joint Typhoon Warning Center (JTWC), a combined Air Force/Navy organization operating under the command of the Commanding Officer, U.S. Naval Pacific Meteorology and Oceanography Center West (NAVPACMETOCEN WEST)/Joint Typhoon Warning Center, Guam. The JTWC was founded 1 May 1959 when the U.S. Commander-in-Chief Pacific (USCINCPAC) forces directed that a single tropical cyclone warning center be established for the western North Pacific region. The operations of JTWC are guided by USCINCPAC Instruction 3140.1W. The mission of JTWC is multifaceted and includes: (1) Continuous monitoring of all tropical weather activity in the Northern and Southern Hemispheres, from 1800 east longitude west-ward to the east coast of Africa, and the prompt issuance of appropriate advisories and alerts when tropical cyclone development is anticipated; (2) Issuance of warnings on all significant tropical cyclones in the above area of responsibility; (3) Determination of requirements for tropical cyclone reconnaissance and assignment of appropriate priorities; (4) Post-storm analysis of significant tropical cyclones occurring within the western North Pacific and North Indian Oceans; and (5) Cooperation with the Naval Research Laboratory, Monterey, California on evaluation of tropical cyclone models and forecast aids, and the development of new techniques to support forecast requirements.

DTIC

Cyclones; Tropical Regions; Weather Forecasting; Tropical Storms

19980014208 Naval Postgraduate School, Monterey, CA USA

Diurnal Variation over the Tropical Monsoon Regions During Northern Summer 1991

Jimenez, Greg M., Naval Postgraduate School, USA; Mar. 1997; 177p; In English

Report No.(s): AD-A331689; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This study examines diurnal variation of convection over western India, the Bay of Bengal, Indochina and the northern South China Sea during the 1991 northern summer monsoon using combined Japanese (GMS) and Indian (INSAT) geostationary satellite data, ECMWF 850 hPa wind data, and NCEP sea surface temperature analyses. The diurnal cycle is examined in terms of spatial and temporal structure prior to onset and during the monsoon. The northern South China Sea is examined to determine how different periods of synoptic influences resulted in an anomalously strong diurnal signal during June. The wind and SST data are used to examine the relationship between the diurnal variation of convection and both low level convergence and vertical latent heat fluxes. Convection over west India is most common during May and June and starts as a diurnal system over land that becomes organized and propagates westward over the east Arabian Sea. The Bay of Bengal follows the classic land-sea breeze model and convection is modulated by convergence between the land breeze and large-scale monsoon flow. The diurnal cycle is generally enhanced over the ocean during active phases of convective activity. The maximum latent heat fluxes generally occurs prior to maximum convection due to strong monsoon flow enhancing evaporation.

DTIC

Monsoons; Diurnal Variations; Convection; Sea Surface Temperature; Tropical Regions; Indian Spacecraft; Convergence

19980014442 Naval Research Lab., Marine Meteorology Div., Monterey, CA USA

A Technical Description of the NRL Adjoint Modeling System Final Report

Rosmond, Thomas E., Naval Research Lab., USA; Apr. 1997; 57p; In English

Report No.(s): AD-A330960; NRL/MR/7532--97-7230; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report describes the tangent linear model (TLM), and the accompanying adjoint model, for the Navy Operational Global Atmospheric Prediction System (NOGAPS) spectral forecast model. Details are given for the linearization of the model equations, the development of the matrix transpose operators that constitute the adjoint model, and a discussion of the self-adjoint properties of the spherical harmonic transforms, unique to spectral models such as NOGAPS. A powerful application of the TLM and adjoint models, the calculation of singular vectors about a basic state trajectory forecast of the non-linear NOGAPS model, is also

described. Some illustrative examples of singular vector and adjoint model calculations are given. Full model codes are available by request from the author.

DTIC

Atmospheric Models; Linearization; Matrices (Mathematics); Nonlinearity; Operators (Mathematics); Trajectories; Transformations (Mathematics)

19980014457 Arizona Univ., Optical Sciences Center, Tucson, AZ USA

Topics in Unconventional Imagery Final Report

Frieden, B. R., Arizona Univ., USA; Graser, David J., Arizona Univ., USA; Nov. 04, 1997; 4p; In English

Contract(s)/Grant(s): F49620-96-1-0352

Report No.(s): AD-A331691; AFOSR-TR-97-0582; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Two problems in unconventional imagery, were worked on, (a) an exact solution to the in age turbulence problem (also called the 'blind deconvolution' problem); and (b) closed-form maximum entropy (M.E.) image restoration Progress on (a) was as follows. It was found that by dividing the image spectra of two short-exposure images of an incoherent object viewed through random turbulence, a system of linear equations can be generated. The unknowns of the equations are the sampled values of the two point spread functions characterizing the two images. These can be found, with arbitrary precision, by simple inversion of the equations. Then the object is restored by inverse filtering the two images with transfer functions generated from the known point spread functions. The approach works perfectly in the absence of additional randomness due to noise of detection, and tolerates small amounts of such noise. Progress on (b) was as follows. Doctoral student David Graser tested out the closed-form M.E. approach by computer simulation. Two widely-used classes of test objects, point sources and edge sources, were used as inputs, and these were imaged using Gaussian spread functions of given halfwidths. The M.E. outputs were found to be, overall, superior to corresponding outputs using clipped inverse-filtering and Wiener filtering.

DTIC

Computerized Simulation; Linear Equations; Turbulence; Imagery; Point Sources; Maximum Entropy Method

19980014809 National Oceanic and Atmospheric Administration, Silver Spring, MD USA

NOAA Mesoscale Modelers' Report: Opportunities for Collaboration

McQueen, J., National Oceanic and Atmospheric Administration, USA; Ching, J., National Oceanic and Atmospheric Administration, USA; Mitchell, K., National Weather Service, USA; Schlatter, Thomas, National Oceanic and Atmospheric Administration, USA; Stensrud, D., National Oceanic and Atmospheric Administration, USA; 1996; 56p; In English

Report No.(s): PB97-106173; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

A meeting of regional-scale numerical modelers was conducted at Research Triangle Park, North Carolina, on 1 and 2 May, 1996. The meeting was a gathering of hands-on model developers, operating within the different elements of NOAA where regional scale models are being constructed. For air quality prediction (on all scales), three modeling components must be addressed: (1) specification of the source terms, (2) specification of the relevant wind fields and atmospheric structure, and (3) description of relevant transport, dispersion, and deposition.

NTIS

Mesoscale Phenomena; Velocity Distribution; Forecasting; Air Quality; Scale Models

19980015207 Illinois State Water Survey, Champaign, IL USA

Investigation of Historical Temperature and Precipitation Data at Climate Benchmark Stations in Illinois

Changnon, S. A., Illinois State Water Survey, USA; Winstanley, D., Illinois State Water Survey, USA; Kunkel, K. E., Illinois State Water Survey, USA; 1997; 92p; In English

Report No.(s): PB98-114663; ISWS/CIR-184/97; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Twelve weather stations in Illinois with long records (1901-1995) of temperature and precipitation were assessed as possible benchmark stations with quality data for use in studies of past fluctuations of climate and for monitoring future changes in climate. Temperatures in Illinois increased 2.5 F from 1900 to the 1930s, remained high until the late 1950s, and decreased by 2.5 F since. Precipitation since 1900 has varied regionally, increasing in the north and west, and remaining unchanged in the south. Climate changes in Illinois are discussed in the context of global climate change.

NTIS

Weather Stations; Climatology; Climate Change; Atmospheric Temperature; Precipitation (Meteorology)

19980015291 Cornell Univ., Dept. of Geological Sciences, Ithaca, NY USA

SIR-C/X-SAR Analysis of Topography and Climate in the Central Andes

Isacks, Bryan, Cornell Univ., USA; Bloom, Arthur L., Cornell Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 73-77; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress and future plans are presented for the following objectives: (1) Understand large-scale interactions between tectonic and climate-controlled erosional processes that created the Andes; and (2) Determine the modern and Pleistocene snow-line altitudes and gradients in a poorly known but critical latitude range of the central Andes, and interpret ice-age changes in atmospheric circulation.

Derived from text

Shuttle Imaging Radar; Glaciers; Land Ice; Radar Imagery; Synthetic Aperture Radar; Remote Sensing; Image Analysis

19980015292 Jet Propulsion Lab., California Inst. of Tech., Pasadena, CA USA

The Joint Analyses of Single- and Dual-Frequency/Experimental Dual-Polarization SIR-C and X-SAR Measurements in Precipitation

Jameson, Arthur R., Applied Research Corp., USA; Li, Fuk, Jet Propulsion Lab., California Inst. of Tech., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 78-83; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Progress, future plans and publications regarding the following objectives are presented: (1) Determine the vertical and horizontal spatial distribution of hydrometeors in precipitating clouds; (2) Measure the spatial distribution of liquid water and ice in the clouds; and (3) Measure and determine the limits of measurement of the polarization characteristics related to the shapes and orientations of hydrometeors in precipitating clouds.

Derived from text

Hydrometeors; Polarization Characteristics; Shuttle Imaging Radar; Clouds (Meteorology); Precipitation (Meteorology); Image Analysis; Synthetic Aperture Radar; Multispectral Radar

19980016165 NASA Langley Research Center, Hampton, VA USA

Surface-Based Observations of Contrail Occurrence Over the US, Apr. 1993 to Apr. 1994

Minnis, Patrick, NASA Langley Research Center, USA; Ayers, J. Kirk, Analytical Services and Materials, Inc., USA; Weaver, Steven P., Weather Squadron (88th), USA; Dec. 1997; 82p; In English; Original contains color illustrations
Contract(s)/Grant(s): RTOP 538-08-12-01

Report No.(s): NASA-RP-1404; NAS 1.61:1404; L-17633; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Surface observers stationed at 19 U.S. Air Force Bases and Army Air Stations recorded the daytime occurrence of contrails and cloud fraction on an hourly basis for the period April 1993 through April 1994. Each observation uses one of four main categories to report contrails as unobserved, non-persistent, persistent, and indeterminate. Additional classification includes the co-occurrence of cirrus with each report. The data cover much of the continental U.S. including locations near major commercial air routes. The mean annual frequency of occurrence in unobstructed viewing conditions is 13 percent for these sites. Contrail occurrence varied substantially with location and season. Most contrails occurred during the winter months and least during the summer with a pronounced minimum during July. Although nocturnal observations are not available, it appears that the contrails have a diurnal variation that peaks during mid morning over most areas. Contrails were most often observed in areas near major commercial air corridors and least often over areas far removed from the heaviest air traffic. A significant correlation exists between mean contrail frequency and aircraft fuel usage above 7 km suggesting predictive potential for assessing future contrail effects on climate.

Author

Contrails; Cirrus Clouds; Diurnal Variations

19980016627 Aerospace Corp., Technology Operations, El Segundo, CA USA

Ground Cloud Dispersion Measurements During The Titan 4 Mission Number K2 (3 July 1996) at Cape Canaveral Air Station, Volume 1, Test Overview and Data Summary

Jul. 15, 1997; 78p; In English

Contract(s)/Grant(s): F04701-93-C-0094

Report No.(s): AD-A329640; TOR-TR-97(1410)-6-Vol-1; SMC-TR-97-19-Vol-1; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Launch plume imagery and ground HCl measurements were accomplished during the launch of Titan IV Mission #K2 at Cape Canaveral Air Station on 3 July 1996. These data will be used to improve the accuracy of the Rocket Exhaust Effluent Diffusion Model. The imagery from three sites (integrated IR and visible imagers at each) showed a cloud stabilization height of 1871 m (72% higher than predicted), reached in 10-14 min (4% to 46% longer than predicted). The cloud trajectory was east-northeasterly, similar to prediction, and the 6.2 m/s speed was 44% faster than predicted. Aircraft HCl measurements were not taken for this launch. Ground dosimeters around the launch pad measured dosages as high as 378 ppm min.

DTIC

Cloud Height Indicators; Guidance (Motion); Launching; Meteorological Parameters

19980016656 National Oceanic and Atmospheric Administration, Environmental Technology Lab., Boulder, CO USA

Measurement of Property Gradients and Turbulence Aloft with Ground-Based Doppler Radars

Gossard, E. E., Colorado Univ., USA; Strauch, R. G., Colorado Univ., USA; Stankov, B. B., National Oceanic and Atmospheric Administration, USA; Wolfe, D. E., National Oceanic and Atmospheric Administration, USA; Aug. 1995; 36p; In English Report No.(s): PB96-128137; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Results are described of an experiment to test the accuracy of a radar technique for calculating height profiles of turbulent dissipation rate and structure parameters in the clean air. The technique uses the second moment of the Doppler spectrum of back-scatter from refractive index turbulence fluctuations. Such remote sensing of turbulence by present state-of-the-art wind would allow routine monitoring of profiles of the intensity of turbulence and its outer scale throughout the lower atmosphere. The experiment lends support to the accuracy of the technique.

NTIS

Doppler Radar; Lower Atmosphere; Remote Sensing; Turbulence

19980016821 National Weather Service, Western Region, Salt Lake City, UT USA

Climate of Salt Lake City, UT

Alder, W. J., National Weather Service, USA; Buchanan, S. T., National Weather Service, USA; Cope, W., National Weather Service, USA; Cisco, J. A., National Weather Service, USA; Schmidt, C. C., National Weather Service, USA; Apr. 1996; 96p; In English

Report No.(s): PB96-175583; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The purpose of this publication is to attempt to bring together under one cover as much data as possible concerning the climate of Salt Lake City. The statistics in this report are based on the airport weather records which began May 1, 1928.

NTIS

Climate; Utah; Weather; Meteorological Parameters

19980016870 University of Central Florida, Dept. of Civil Engineering and Environmental Sciences, Orlando, FL USA

Intensity-Duration-Frequency Curves for the State of Florida Final Report, 20 Aug. 1993 - 30 Nov. 1995

Wanielist, M., University of Central Florida, USA; Eaglin, R., University of Central Florida, USA; Eaglin, L., University of Central Florida, USA; Mar. 1996; 340p; In English

Report No.(s): PB96-162334; No Copyright; Avail: CASI; A15, Hardcopy; A03, Microfiche

In the work, the development of the IDF curves was achieved by using statistical analysis of historical rainfall data from sites within the adjacent to the boundaries of the State. A total of 107 sites were used, each site containing between 11 and 48 years of data in either 15 minute or hourly increments. These data were simplified into a format suitable for statistical analysis. The product of these statistical analyses are the IDF curves for different regions of the State. to perform these analyses, a number of computer programs were developed. An important result was that the IDF curves exhibited significant variability from one rainfall station to another.

NTIS

Florida; Frequencies; Rain; Statistical Analysis

19980016873 Agricultural Research Service, Greenbelt, MD USA

Proceedings of the Workshop on Climate and Weather Research

Richardson, C. W., Editor, Agricultural Research Service, USA; Johnson, G. L., Editor, Agricultural Research Service, USA; Ferreira, V. A., Editor, Agricultural Research Service, USA; Doraiswamy, P. C., Editor, Agricultural Research Service, USA; Apr. 1997; 225p; In English; Workshop on Climate and Weather Research, 17-19 Jul. 1995, Denver, CO, USA

Report No.(s): PB97-166045; USDA/ARS-1996-03; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

The Workshop included two major components. The first component involved presentations that described research results, on-going research, activities by users and cooperating agencies, and related activities. These presentations were divided into three major topics: (1) Temporal and Spatial Characterization of Weather, (2) Application of Weather and Climate Information, and (3) Weather Analysis and Simulation. The second component of the Workshop involved group discussions focused on the development of a strategic plan for climate and weather research that would lead to results that are of practical value in making management decisions or techniques that can be used for a variety of assessments. The discussions were also intended to define the needs of the users of the research and to develop potential cooperative efforts between ARS research locations, user agencies, university scientists, and other potential cooperators.

NTIS

Management Methods; Weather; Meteorology

48 OCEANOGRAPHY

Includes biological, dynamic, and physical oceanography; and marine resources. For related information see also 43 Earth Resources and Remote Sensing.

19980013921 Naval Research Lab., Stennis Space Center, MS USA

The Accuracy of the Navy-Standard Surf Model-Derived Modified Surf Index and its Sensitivity to Nearshore Bathymetric Profile Errors *Final Report*

May, Douglas A., Naval Research Lab., USA; Mettlach, Theodore R., Neptune Sciences, Inc., USA; Oct. 24, 1997; 35p; In English Report No.(s): AD-A331685; NRL/FR/7240--97-9665; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Naval Research Laboratory's Remote Sensing Applications Branch has evaluated the sensitivity of the Navy-Standard Surf Model to nearshore bathymetric profiles, primarily focusing on the modified surf index (MSI) accuracy. The Navy-Standard Surf Model was first introduced in 1988 and is now used extensively throughout the Fleet as part of the Geophysical Fleet Meteorological Program Library and the Tactical Environmental Support System. The model is the primary software for objective forecasting of surf conditions and its accuracy is highly dependent upon the accuracy of the model inputs. The two most important inputs are the nearshore depth profile or bathymetry and the offshore wave conditions. This report describes the performance of the model relative to bathymetric profile errors. Model sensitivity to these errors is important for estimating model accuracy in denied areas where bathymetric data is less complete. The Navy-Standard Surf Model was tested against field measurement data obtained from the DELILAH experiment held at the Duck, NC, Field Research Facility in 1990. Offshore directional wave spectra, wind, longshore current, wave height, depth profile, tide, and surf zone width measurements provided a rigorous data set for evaluating model performance and sensitivity. This study focused on field measurements obtained during the week of 12 Oct 1990. Daily nearshore depth profiles were used to evaluate model accuracy relative to profile age and slope estimation error. The latter was calculated by synthetically altering the valid profiles to contain percentage slope errors. Rudimentary bottom composition-based profiles were also utilized. A total of 373 surf model runs were made using valid wind, tide, and wave inputs for the various bathymetric profiles. The statistical analysis consists of tabulations, graphical plots, and accuracy measures.

DTIC

Bathymeters; Ocean Models; Coastal Currents; Statistical Analysis; Forecasting; Remote Sensing; Air Currents; Sensitivity

19980014215 Massachusetts Inst. of Tech., MIT/Marine Industry Collegium, Cambridge, MA USA

AUV Research: Challenges and Opportunities in the Coastal Environment

Morris, R., Massachusetts Inst. of Tech., USA; Mar. 1995; 33p; In English

Contract(s)/Grant(s): NA91AA-D-SG424

Report No.(s): PB96-165816; MITSG-95-2; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Table of Contents: Symposium Agenda; Synopses of Presentations; The Third Wave in Coastal Monitoring and Management: Building a Market for AUVs; Approaches to the Measurement of Key Ecological Parameters in Variable Coastal Environments: Potential Role for AUVs; Mapping Shallow Water Variability with the Large Diameter Unmanned Underwater Vehicle (LDUUV); Autonomous Oceanographic Sampling Network (AOSN); Electric Motors for AUV Propulsion; Time Constrained Surveys; Acoustic Navigation in Ocean Waveguides; Visualization of the Ocean Coastal Environment with Applications to AUV Development; Ocean Data Telemetry Update: A Review of Options to Ocean Researchers; Telemetry; Sub-Surface Acoustic

Channels; Applications of a Fiber-Optic Fluorescence Sensor for AUVs; Acoustic and Optical Imaging; Zinc-Silver Oxide Battery Development Program Overview; and Advanced Electrochemistries for UUV Propulsion.

NTIS

Underwater Vehicles; Oceanography; Coasts; Environmental Surveys; Conferences; Marine Environments

19980014451 Naval Research Lab., Stennis Space Center, MS USA

A Semi-Empirical Longshore Current Model *Final Report*

Lundberg, Dennis L., Naval Research Lab., USA; Holland, K. T., Naval Research Lab., USA; Church, John C., Naval Research Lab., USA; Oct. 24, 1997; 40p; In English

Report No.(s): AD-A331687; NRL/MR/7442--97-8066; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A semi-empirical longshore current model has been developed that is not reliant upon bathymetry. The model inputs are wave breaker height, wave breaker angle, and the surf width. The output is a cross-shore profile of the longshore current that is consistent with field observations for both planar and barred beaches. Since the model inputs are those that can be readily determined by observation, this model has utility for forward deployed operational forces that may not have ready access to more sophisticated models and measurement techniques. The concept of wave radiation stress was used to provide the driving force in the model. The model was developed and tested from data gathered at Duck, NC during the DELILAH experiment in October, 1990. The beach at Duck had an offshore bar during the data collection. The average absolute deviation of the model compared to the measured data was 19%. The model will require further testing to verify its general application for both plane and barred beaches.

DTIC

Ocean Currents; Ocean Models; Coastal Currents; Hydrodynamics; Data Acquisition; Electromagnetic Radiation

19980015099 Woods Hole Oceanographic Inst., Dept. of Applied Ocean Physics and Engineering, MA USA

Enhanced Imaging Techniques for the Study of the Time-Evolution of Microscale Bed Geometry *Final Report, 1 Jan. 1993 - 31 Dec. 1995*

Wheatcroft, Robert A., Woods Hole Oceanographic Inst., USA; Nov. 04, 1997; 4p; In English

Contract(s)/Grant(s): N00014-93-I-0183

Report No.(s): AD-A331379; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The objective of this proposal was to develop and apply computer-based, digital image processing techniques to the measurement of high-resolution (millimeter to decimeter) seafloor topography. Stereophotographs were collected as part of the 1990-1991 Sediment TRansport Events of Shelves and Slopes (STRESS) field program. A free-vehicle stereocamera tripod was deployed in mid-November 1990 at the 90-m STRESS site and successfully recovered in mid-March 1991. Results of the automatic image fusion research were disappointing, hence STRESS stereophotographs were analyzed manually using an analytical stereocomparator. During the deployment, five qualitatively different bed configurations were observed. In order of decreasing frequency these were: (1) biogenically reworked bed, (2) smoothed to scoured bed, (3) current-rippled bed, (4) scour-pitted bed, and (5) wave-rippled beds. Total vertical bed relief within the field of view was found to be typically less than 6 cm and the r-m-s vertical relief was of order 1 cm. Maximal relief occurred when the bed was current rippled (heights average 2 cm and lengths are about 15 cm) and was minimal following scour events. This study demonstrated that seafloor relief can change rapidly over short time scales.

DTIC

Sediment Transport; Image Processing; Time Functions; Ocean Bottom; Imaging Techniques; Topography

19980015108 Naval Research Lab., Stennis Space Center, MS USA

Software Requirements Specification for the Navy SeaWiFS Ocean Color Module (OCM), Version 1.0

Jul. 1997; 29p; In English

Report No.(s): AD-A331901; NRL/CR/7340--97-0002; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This document identifies the Navy's SeaWiFS Ocean Color Module (OCM) software engineering requirements, including operating systems and languages used, and provides an overview of the types of data processed via the levels required to obtain the data products.

DTIC

Software Engineering; Ocean Models; Languages; Operating Systems (Computers); Coastal Ecology

19980015124 Naval Research Lab., Stennis Space Center, MS USA

Oceanology InterNational 1996 Environmental Factors Affecting the Acoustic Resonant Frequency Due to Internal Solitons, Volume 1

Broadhead, Michael K., Naval Research Lab., USA; Field, Robert L., Naval Research Lab., USA; Mar. 1996; 10p; In English;

Conference Proceedings, 5-8 Mar. 1996, Brighton, UK

Report No.(s): AD-A331375; NRL/PP/7173--96-0001; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Nonlinear shallow water internal waves can enhance the bottom interaction of underwater sound. For a lossy ocean bottom, this has the effect of an overall level change (in addition to fluctuations) in the transmission loss at preferred ('resonant') frequencies. The mechanism for this effect is acoustic mode coupling due to the depression of higher sound speed water into lower speed water (at the pycnocline). It is also possible for this mechanism to induce a transfer of acoustic energy from below the thermocline into the mixed layer, and we concentrate on this scenario. One of the environmental effects on the length scale of the internal wave packet has been shown to be dissipation. The effect of this scale broadening on the resonant frequency is studied. Through rigorous simulations, it is shown that this effect produces a positive shift in the frequency line structure. Also offered is a simple model for this effect, based on mode coupling theory, that qualitatively predicts several features observed in the simulations.

DTIC

Conferences; Ocean Dynamics; Resonant Vibration; Sound Waves

19980015132 National Oceanic and Atmospheric Administration, Environmental Technology Lab., Boulder, CO USA

Fram Strait Acoustic Monitoring for Ocean Climate Studies: A Workshop Report

Johannessen, O. M., National Oceanic and Atmospheric Administration, USA; Naugolnykh, K. A., National Oceanic and Atmospheric Administration, USA; Shang, E. C., National Oceanic and Atmospheric Administration, USA; Konstantin, A., National Oceanic and Atmospheric Administration, USA; Sep. 1996; 46p; In English; Fram Strait Acoustic Monitoring for Ocean Climate Studies, 25-26 Sep. 1996, Boulder, CO, USA

Report No.(s): PB98-101215; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Fram Strait Acoustic Monitoring for Ocean Climate Studies Workshop was held at the NOAA Environmental Technology Laboratory in Boulder, Colorado, on September 25-26, 1996. The workshop was convened to discuss and develop a prioritized scientific plan focused on a systems approach to the oceanographic investigation of the Fram Strait. Major topics discussed during the workshop included: monitoring of heat and water mass influx through the Fram Strait as part of a general problem of Arctic warming; acoustic tomography monitoring of the Fram Strait; monitoring of flux into the Arctic; and planning of a pilot experiment and feasibility test.

NTIS

Environmental Laboratories; Marine Meteorology; Oceanography; Tomography

19980015197 Naval Postgraduate School, Monterey, CA USA

Time and Space Resolution and Mixed Layer Model Accuracy

Hone, David M., Naval Postgraduate School, USA; Mar. 1997; 68p; In English

Report No.(s): AD-A330991; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The oceanic turbulent boundary layer is a critical region to understand for oceanic and atmospheric prediction. This thesis answers two fundamental questions: (1) what is the response of the ocean mixed layer system to transient forcing at the air sea surface? (2) what is the necessary time and space resolution in an ocean mixed layer model to resolve important transient responses? Beginning with replication of de Szoeke and Rhines' work, additional physical processes were added to include more realistic viscous dissipation and anisotropy in the three-dimensional turbulent kinetic energy (TKE) budget. These refinements resulted in modification of de Szoeke and Rhines' findings. Firstly, TKE unsteadiness is important for a minimum of 10 to the 5th power seconds. Secondly, viscous dissipation should not be approximated as simply proportional to shear production. Thirdly, entrainment shear production remains significant for a minimum of one pendulum-day. The required temporal model resolution is dependent on the phenomena to be studied. This study focused on the diurnal, synoptic, and annual cycles, which the one-hour time step of the Naval Postgraduate School model adequately resolves. The study of spatial resolution showed unexpectedly that model skill was comparable for 1 m, 10 m and even 20 m vertical grid spacing.

DTIC

Anisotropy; Diurnal Variations; Energy Budgets; Entrainment; Kinetic Energy; Ocean Models; Ocean Surface; Spatial Resolution; Temporal Resolution

19980015198 Naval Postgraduate School, Monterey, CA USA

The Generation and Characterization of Surf Zone Aerosols and Their Impact on Naval Electro-Optical Systems

Kiser, Robert E., Naval Postgraduate School, USA; Mar. 1997; 75p; In English

Report No.(s): AD-A330990; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Aerosols are generated within the surf zone by the breaking of waves along the beachfront. The concentration of aerosols, size and structure of these plumes are impacted by the air/sea temperature differences, breaker type and local winds. During the

EOPACE 1 surf experiment at Lalolla, CA, it was observed that under light wind conditions, standing aerosol plumes would develop to heights of 31 meters. Concurrently, transmittance at FLIR wavelengths would be degraded up to 35%. Similar aerosol plume structures were observed during EOPACE 2 at Moss Landing, CA. These results are used to characterize and forecast standing plume conditions that may impact Electro-Optical transmission.

DTIC

Air Water Interactions; Electro-Optics; FLIR Detectors; Temperature Gradients; Wind Direction; Wind Velocity

19980015243 North Carolina State Univ., Dept. of Marine, Earth and Atmospheric Sciences, Raleigh, NC USA

Field Studies of Nearshore Sedimentary Structures Final Report

Drake, Thomas G., North Carolina State Univ., USA; Sep. 1997; 155p; In English

Report No.(s): AD-A331002; CHL-97-3; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This report describes research conducted as part of the Duck94 Nearshore Processes Field Experiment, a multidisciplinary study that took place during the summer and fall months of 1994. Work consisted of reconnaissance field studies which sought to develop tools for hydrodynamic and bathymetric interpretation of nearshore sedimentary structures, using as primary data sediment cores taken in close proximity to fluid motion and bed elevation measurements. The report contains core logs of sedimentological data, which record the time, location, and orientation of all samples, as well as a description of sedimentary structures obtained by visual inspection and by x-radiographs.

DTIC

Bathymeters; Hydrodynamics; Radiography; Reconnaissance; Sediments; Summer

19980015276 Hamburg Univ., Inst. of Oceanography, Germany

Comparison of SIR-C Simulated and Measured SIR-C SAR Image Spectra with Ocean Wave Spectra Derived from Buoys and Wave Production Models in the North Sea

Alpers, Werner, Hamburg Univ., Germany; Masuko, H., Radio Research Labs., Japan; Trivero, P., Consiglio Nazionale delle Ricerche, Italy; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 3-6; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The objectives of the project were to carry out measurements of two-dimensional ocean wave spectra by a pitch and roll buoy from the Forschungsplattform Nordsee (Germany Research Platform North Sea) and from a ship of the German Hydrographic Office in the North Sea and to collaborate with North Sea oil rig operators to obtain wave spectra from these sites. A third generation wave prediction model (WAMODEL) will be applied to forecast and hindcast the wave fields in the North Sea from the measured wind history during the SIR-C overflight. The WAMODEL has a resolution of 0.5 degree longitude and 0.25 degree latitude. This model (Komen and Zambreski, 1986; Bauer et al. 1988) seems to be accurate in predicting two-dimensional ocean wave spectra in the North Sea and will be refined for the SIR-C mission. Progress, significant results and future plans for the project are included in the paper.

Author

Shuttle Imaging Radar; Synthetic Aperture Radar; Radar Signatures; Ocean Surface; Ocean Models; Oil Slicks; Water Waves; Ocean Data Acquisitions Systems

19980015277 Johns Hopkins Univ., Applied Physics Lab., Laurel, MD USA

Global Wave Forecasting in the Southern Ocean

Beal, Robert C., Johns Hopkins Univ., USA; Monaldo, Frank M., Johns Hopkins Univ., USA; Gerling, Thomas, Johns Hopkins Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 7-9; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The goal of this project is to demonstrate the potential value of spaceborne Synthetic Aperture Radar (SAR) for operational ocean wave monitoring and forecasting. This project complements the Space Radar Laboratory (SRL) investigation "Optimization of SAR Parameters for Wave Spectra", with somewhat overlapping tasks and similar goals, that is, the understanding and application of spaceborne SAR to operational ocean wave monitoring and forecasting.

Author

Synthetic Aperture Radar; Ocean Data Acquisitions Systems; Surface Waves; Forecasting; Water Waves

19980015285 Hawaii Univ., Hawaii Inst. of Geophysics, Honolulu, HI USA

Reconstruction of the Mesoscale Velocity Shear Seaward of Coastal Upwelling Regions from the Refraction of the Surface Wave Field

Flament, Pierre, Hawaii Univ., USA; Graber, Hans C., Woods Hole Oceanographic Inst., USA; Halpern, D., Jet Propulsion Lab., California Inst. of Tech., USA; Holt, B., Jet Propulsion Lab., California Inst. of Tech., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 52-54; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The objective of this project is to study fronts that develop at the boundary between cold water recently upwelled to the surface through Ekman divergence, and warmer surrounding waters. This specific objective was suggested by studying the small scale structure of upwelling fronts (coastal, island, and equatorial) through shipboard surveys and infrared satellite images. Constraints on the shuttle equator crossing imposed by other land sites precluded a coverage of the area targeted in the initial SIR-C proposal, the California Current. The site was then relocated to the Equatorial Pacific upwelling tongue, that can be satisfactorily imaged for a wide range of longitudes of the equator crossing. Some limited data was nevertheless obtained over coastal upwelling off California in 1989, using the JPL AIRSAR in multifrequency mode, and over island upwelling off Hawaii in 1990, using the radar in along-track interferometric mode.

Derived from text

Shuttle Imaging Radar; Remote Sensing; Coastal Currents; Synthetic Aperture Radar; Jet Boundaries; Fronts (Meteorology); Upwelling Water; Image Analysis

19980015294 GEC-Marconi Research Centre, Great Baddow, UK

An Investigation of the Imaging of Ocean Waves and Oil Slicks with SIR-C and X-SAR

Keyte, Gordon, GEC-Marconi Research Centre, UK; Matthews, J. P., New South Wales Univ., Australia; Wensink, G. J., Delft Hydraulics Lab., Netherlands; Cordey, R., GEC-Marconi Research Centre, UK; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 88-89; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress, significant results and publications addressing the following objectives are presented: (1) to improve our understanding of ocean-wave imaging by synthetic-aperture radar (SAR); (2) to test the assumptions of backscattering theory with regard to short-wave properties; and (3) to develop new techniques for retrieving ocean-wave spectra from multiparameter SAR.

Derived from text

Backscattering; Imaging Radar; Imaging Techniques; Ocean Surface; Oil Slicks; Shuttle Imaging Radar; Spectrum Analysis; Synthetic Aperture Radar; Water Waves; Radar Imagery

19980015300 Johns Hopkins Univ., Applied Physics Lab., Laurel, MD USA

Optimization of SAR Parameters for Wave Spectra

Monaldo, Frank M., Johns Hopkins Univ., USA; Beal, R., Johns Hopkins Univ., USA; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 118-120; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress, significant results, and future plans are presented in relation to the following project objectives: (1) Maximize the amount of ocean wave information extracted from SAR imagery; and (2) Determine those SAR parameters ---look angle, frequency, polarization, etc.--- which produce highest fidelity ocean wave spectra.

Derived from text

Ocean Surface; Radar Imagery; Synthetic Aperture Radar; Water Waves; Spectrum Analysis

19980015313 Canada Centre for Remote Sensing, Ottawa, Ontario Canada

SIR-C/X-SAR Wind and Wave Observations in the Gulf of St. Lawrence

Vachon, Paris W., Canada Centre for Remote Sensing, Canada; Dobson, Fred W., Bedford Inst. of Oceanography, Canada; Lalbeharry, Roop, NORUT Information Technology A/S, Norway; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 196-197; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

Progress and future plans for the following objectives are presented: (1) Quantify the frequency/polarization dependence of the real aperture radar (RAR) modulation transfer function (MTF); (2) Extend wind retrieval models such as CMOD4 (valid for

C-band VV polarization) to other frequencies/polarizations; and (3) Test the ability of the SIR-C/X-SAR to detect wave patterns, including the effects of refraction and diffraction, in shallow areas near islands.

Derived from text

Modulation Transfer Function; Shuttle Imaging Radar; Frequency Distribution; Polarization (Waves); Synthetic Aperture Radar; Wind Measurement; Water Waves; Radar Imagery

19980015323 Pisa Univ., Dept. of Information Engineering, Italy

[Processing Procedures for Estimating the Two-Dimensional Sea Wave Spectrum from Synthetic Aperture Radar Images]

Manara, Giuliano, Pisa Univ., Italy; Science Results from the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar (SIR-C/X-SAR): Progress Report; Apr. 1996, pp. 245-246; In English; Also announced as 19980015275; No Copyright; Avail: CASI; A01, Hardcopy; A03, Microfiche

The research activity at the Department of Information Engineering of the University of Pisa (Italy) has been mainly concerned with the definition of suitable processing procedures for estimating the two-dimensional sea wave spectrum from Synthetic Aperture Radar (SAR) images. Classical methods proposed in the literature rely on the definition of a suitable analytical relationship between the sea-wave spectrum and the corresponding SAR image spectrum. This relationship accounts for the main effects contributing to the image formation process, as for instance velocity bunching, hydrodynamic phenomena, tilting of the local sea surface normal. In the most general case, the function relating the two-dimensional sea wave spectrum to SAR image spectrum is nonlinear, rendering the inversion procedure a very complicated task. A solution to this latter problem can be obtained by resorting to an iterative technique, based on the minimization of a suitable functional. To this end, a sea wave first guess spectrum is assumed; then, this estimate is upgraded at each iteration until convergence is obtained. It is important to note that the convergence of the algorithm strongly depends on the first guess choice, which, in order to guarantee the effectiveness of the procedure, must be not too far from the actual sea wave spectrum. This guess is usually determined through hydrodynamic models or buoy measurements. The availability of experimental data, contemporaneously recorded with in situ measurements, is of fundamental importance for testing and validating the aforementioned techniques. Moreover, this comparative analysis may also suggest optimization and extensions of these spectral estimation methods.

Author

Hydrodynamics; Radar Imagery; Water Waves; Image Processing; Iterative Solution; Optimization; Synthetic Aperture Radar; Spectra; Spectrum Analysis

19980015643 Scripps Institution of Oceanography, Geosciences Research Div., La Jolla, CA USA

Influence of Chemical, Physical, Biological and Geochemical Processes of Early Diagenesis and Material Exchange Across the Sediment/Seawater Interface in Margin Sediments Final Report, 1 Jan. 1992 - 31 May 1997

Kastner, Miriam, Scripps Institution of Oceanography, USA; Sep. 22, 1997; 14p; In English

Contract(s)/Grant(s): N00014-92-J-1225

Report No.(s): AD-A330547; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Long-Term Goals and Summary of Accomplishments: The goals of this project were to determine links between sediment chemistry, physical properties, and microfabric during the early diagenesis of surface and near-surface, organic-rich sediments. To this end, we provided high resolution characterizations of sediment microfabric, physical properties, chemistry, mineralogy, and organic matter content as well as theoretical work on smectite interlayer hydration. The data collected were used to permit observation of organic matter as it occurs in natural sediments, determine the mechanism for the preservation of organic matter in continental margins and the important role clay minerals play in this regard, to evaluate the impact of the oxygen minimum zone on organic matter abundance and regeneration, and to demonstrate the significant impact organic matter has on sediment physical properties. Mathematical relations were also developed to permit the partitioning of 1120 between hydrous mineral phases in the sediment and intergranular porosity and sediment void ratio and preliminary studies were carried out to examine the potential of the stable isotopes of chlorine for fingerprinting sediment pore waters. In addition, statistical data were accumulated that indicate the range of variability of geotechnical properties on millimeter, centimeter, and kilometer scales for undissected portions of the western North American continental slope.

DTIC

Accumulations; Activity (Biology); Chlorine; Clays; Continental Shelves; Geochemistry; High Resolution; Hydration; Interlayers; Isotopes; Millimeter Waves; Mineralogy; Minerals; Organic Chemistry; Organic Materials

19980016546 Science Applications InterNational Corp., Raleigh, NC USA

Instrument Performance and Data Quality Control Analyses for the Physical Oceanography Field Program Offshore North Carolina Final Report

Mar. 1996; 127p; In English

Report No.(s): PB96-185863; MRS-96-0004; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The purpose of this document is to summarize data gathering efforts during the second twelve months of the Field Program. A summary of the data collected and the quality control results is provided. A detailed analysis of instrument and mooring performance during the field program is presented along with calibration results for all CTD data.

NTIS

Oceanography; Ocean Data Acquisitions Systems; North Carolina

19980016879 Consejo Superior de Investigaciones Cientificas, Inst. de Ciencias del Mar, Barcelona, Spain

Scientia Marina, Volume 60

Piraino, S., Consejo Superior de Investigaciones Cientificas, Spain; Boero, F., Consejo Superior de Investigaciones Cientificas, Spain; Bouillon, J., Consejo Superior de Investigaciones Cientificas, Spain; Cornelius, P. F. S., Consejo Superior de Investigaciones Cientificas, Spain; Gili, J. M., Consejo Superior de Investigaciones Cientificas, Spain; Apr. 1996; 242p; In English

Report No.(s): PB97-100796; Copyright Waived; Avail: CASI; A11, Hardcopy; A03, Microfiche

Partial Contents: The polyp and its medusa: a molecular approach; Seasonal changes in the vertical distribution of five species of the family Bougainvilliidae (Anthomedusae) at Lough Hyne, southwest Ireland; Seasonality of hydroids (Hydrozoa, Cnidaria) from an intertidal pool and adjacent subtidal habitats at Race Rocks, off Vancouver Island, Canada; Observations on the settling behavior of planulae of *Clava multicornis* Forskal (Hydroidea, Athecata); Medusae, siphonophores and ctenophores of the Alboran Sea, south western Mediterranean; Dialogue Computer System BIKEY as applied to Diagnostics of Cnidaria (illustrated by an example of hydroids of the genus *Symplectoscyphus*).

NTIS

Annual Variations; Molecular Biology; Marine Biology

19980016883 Naval Research Lab., Oceanography Div., Stennis Space Center, MS USA

Climatology of Wind and Waves from Satellite Altimeters

Hwang, Paul A., Naval Research Lab., USA; Teague, William J., Naval Research Lab., USA; Jacobs, Gregg A., Naval Research Lab., USA; Aug. 1997; 5p; In English; IGARSS 1997 InterNational Geoscience and Remote Sensing Symposium, 3-8 Aug. 1997, Singapore

Report No.(s): AD-A331260; NRL/PP/7332--97-0013; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Based on comparisons with buoy data, the wind speed and wave height measured by satellite altimeters are in excellent agreement with in-situ measurements. In regions of low swell effects, the combination of wind speed and wave height further yields the information of wave period. The long term monitoring of these wave parameters from satellite altimeters can be used to study the wave climate of the world oceans. Examples from application to the Gulf of Mexico and the Yellow and East China Seas are presented. Using three years of TOPEX/POSEIDON continuous data, the annual and seasonal maps of the wind and wave climatology of the two regions can be constructed. Many mesoscale features can be clearly identified, and the geometric effects on the wave pattern can be seen from the wind and wave distributions.

DTIC

Artificial Satellites; Ocean Currents; Air Water Interactions; Altimeters; Climatology; Wind Velocity; Water Waves; Satellite-Borne Instruments

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LIFE SCIENCES (GENERAL)

19980014571 Institute of Nuclear Chemistry and Technology, Warsaw, Poland

Devising of the method for the determination of small and very small amounts of cadmium in biological materials by radiochemical version of neutron activation analysis

Dybczynski, Rajmund, Institute of Nuclear Chemistry and Technology, Poland; Samczynski, Zbigniew, Institute of Nuclear Chemistry and Technology, Poland; 1996; ISSN 1425-7351; 15p; In English

Report No.(s): INCT-4/B/96; DE97-621489; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The newly modified version of the method for the determination of cadmium in biological materials by radiochemical Neutron Activation Analysis (NAA) based on selective post irradiation separation of Cd using ion exchange resin Retardion 11A8 is presented. The conditions necessary for the selective retaining of Cd on the column exploiting both anionic and cationic ion exchange function of the resin have been discussed. Depending on the composition of the external solution, cadmium existing

in the form of either anionic chloride complexes or cationic amine species is taken up by quaternary ammonium or carboxylate functional groups, respectively while accompanying elements are eluted. The elaborated method was further verified by determine Cd content in several certified biological reference materials using neutron activation analysis. The ion exchange separation procedure assures very high radiochemical purity of the cadmium fraction. Decontamination factors obtained for Mo, Sb, Na, Zn, Co, Sc amounted to $10(\text{exp } 3) - 10(\text{exp } 6)$. Detection limit for Cd was 0.5 (micro)g/kg. Analytical results show good agreement with the certified values.

DOE

Technologies; Cadmium; Ion Exchange Resins; Neutron Activation Analysis; Bioassay

19980015375 North Carolina State Univ., Dept. of Microbiology, Raleigh, NC USA

Assessment of the Essentiality of ERG Genes Late in Ergosterol Biosynthesis in *Saccharomyces Cerevisiae*

Parks, Leo W., North Carolina State Univ., USA; Tove, Shirley, North Carolina State Univ., USA; Palmermo, Lizette M., North Carolina State Univ., USA; Leak, Frank W., North Carolina State Univ., USA; Oct. 1997; 24p; In English

Contract(s)/Grant(s): DAAH04-93-D-0003

Report No.(s): AD-A332304; ARO-33043.1-LS; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Fungal biodegradation accounts for enormous damage to stored material through degradation and the production of secondary metabolites. We are seeking to identify reactions that are essential to the survival of fungi. Those involved in sterol biosynthesis have been shown to be required for cell growth and amenable to control by antifungal compounds. We have shown that interconversion of sterols between free and esterified forms maintains the basic level of free sterols. We have identified two conditional mutants that have a defect in sterol esterification which is attendant to inhibition of cell growth. Additional experiments used mutations in the structural genes for ergosterol biosynthesis to assess their essentiality for the fungi. Further work under another contract addresses the influence of sterol alterations on the regulation of gene expression in sterol biosynthesis.

DTIC

Biosynthesis; Fungi; Biodegradation

19980015613 Department of Health and Human Services, National Toxicology Program, Research Triangle Park, NC USA

NTP Summary Report on the Metabolism, Disposition, and Toxicity of 1,4-Butanediol (CAS No. 110-63-4)

Irwin, R. D., Department of Health and Human Services, USA; May 1996; 44p; In English

Report No.(s): PB97-108161; NIH/PUB-96-3932; NTP-TOXICITY-SER-54; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

1,4-Butanediol is an industrial chemical used in the manufacture of other organic chemicals. It was nominated by the National Cancer Institute and selected for evaluation by the NTP because of high production volume, the potential for worker exposure, the lack of adequate toxicological characterization, and the lack of evaluation for carcinogenic potential. As documented in the scientific literature, 1,4-butanediol is rapidly absorbed and metabolized to gamma-hydroxybutyric acid in animals and humans. A metabolism and disposition study conducted in F344/N rats by the NTP confirmed the rapid and extensive conversion of 1/(14C)-1,4-butanediol to 14CO_2 . Because of this rapid and extensive conversion, the toxicological profile of 1,4-butanediol reflects that of gamma-hydroxybutyric acid. gamma-Hydroxybutyric acid is a naturally occurring chemical found in the brain and peripheral tissues which is converted to succinate and processed through the tricarboxylic acid cycle.

NTIS

Toxicity; Metabolism; Chemical Tests; Butanes

19980015631 York Univ., UK

Toughening Mechanisms in Biological Hard Tissues *Final Report, May 1991 - May 1994*

Currey, John D., York Univ., UK; Feb. 1995; 6p; In English

Contract(s)/Grant(s): AF-AFOSR-0204-91; AF Proj. 2302; AF Proj. 2303

Report No.(s): AD-A329771; AFOSR-97-0490TR; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

We have studied toughening mechanisms in mineralised tissues. We have demonstrated the importance of microdamage as a universal toughening mechanism. This is clear from all the mineralised tissues we have examined. The tougher tissues have a variety of mechanisms to increase elongation before fracture, and these are rather different in antler and in dentine. (Antler has fibers that behave telescopically and also has a structure that forces microcracks to depart from the most dangerous orientation; dentine has a structure that initially induces yield at 450 to the loading direction, whatever that is, but at higher strains induces clouds of microcracks in the direction of the loading, and finally the macrocrack is diverted by the predominant fiber direction.) We have examined such toughening mechanisms by a combination of mechanical testing, (including static, impact and fatigue loading) optical examination, scanning confocal microscopy, acoustic emission, fractal analysis of fracture surfaces, and some

finite element analysis. The work on the grant has resulted in 5 papers published or in press in refereed journals, two chapters in books published or in press, and one large paper (on fatigue) which has just been submitted. We expect two more papers based on AFOSR work to appear.

DTIC

Acoustic Emission; Crack Propagation; Cracks; Fiber Orientation; Finite Element Method; Presses; Static Loads; Tissues (Biology)

19980016683 Florida State Univ., Tallahassee, FL USA

Electrophysiological Properties of Intrinsic Circadian Oscillators in the Chick Pineal Gland *Final Report*

Dryer, Stuart E., Florida State Univ., USA; Jan. 1997; 15p; In English

Contract(s)/Grant(s): F49629-93-I-0303; AF Proj. 2312

Report No.(s): AD-A329751; AFOSR-TR-97-0415; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Photoreceptors of the chick pineal are one of the only vertebrate intrinsic circadian oscillators amenable to cellular analysis. We characterized the electrophysiological properties of these cells using patch clamp and fura-2 recording techniques. We analyzed several types of voltage- and cGMP-activated ionic channels, and obtained evidence that cGMP-activated channels participate in phototransduction. We also examined intracellular Ca(2+) dynamics and obtained evidence for the existence of intracellular Ca(2+) stores and Ca(2+) oscillations that can be mobilized by drugs and hormones that increase cAMP and promote melatonin secretion. Norepinephrine, which inhibits melatonin secretion, had no effect on Ca(2+) dynamics. Most importantly, we discovered a new type of ionic channel, ILOT, whose gating is under direct circadian control. ILOT is permeable to Ca(2+), but its gating is not controlled by membrane potential or intracellular ligands. ILOT has unusual kinetic properties, as it can stay open for seconds at a time. This feature is not seen in other types of ionic channels. ILOT is only active in the nighttime, even in pineal cells free-running in constant-dark conditions. ILOT is also present in chick retinal photoreceptors, which also contain a circadian oscillator. ILOT therefore represents a logical target for pharmacological manipulation of circadian output.

DTIC

Circadian Rhythms; Pineal Gland; Electrophysiology; Cells (Biology); Photoreceptors; Vertebrates

19980016846 Department of Health and Human Services, National Toxicology Program, Research Triangle Park, NC USA

NTP Technical Report on Toxicity Studies of Urethane in Drinking Water and Urethane in 5 percent Ethanol Administered to F344/N Rats and B6C3F1 Mice

Chan, P. C., Department of Health and Human Services, USA; Mar. 1996; 147p; In English

Report No.(s): PB96-175575; NIH/Pub-96-3937; NTP-Toxicity-Ser-52; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Urethane, a byproduct of fermentation found in alcoholic beverages, is carcinogenic in rodents and is classified by the International Agency for Research on Cancer as a possible human carcinogen. The USA Food and Drug Administration nominated urethane for study because of the widespread exposure of humans through the consumption of fermented foods and beverages and because of a lack of adequate dose-response data about the carcinogenicity of urethane with and without the coadministration of ethanol. Comparative studies of urethane in drinking water and in 5% ethanol were conducted to investigate possible effects of ethanol on urethane toxicity. Toxicokinetic studies of urethane in drinking water and in 5% ethanol and genetic toxicity studies of urethane in vivo and in vitro were also conducted.

NTIS

Toxicity; Carcinogens; Fermentation; Ethyl Alcohol; Potable Water; Urethanes; Cancer

19980016847 NERAC, Inc., Tolland, CT USA

Aquaculture: Algae. (Latest citations from the Life Sciences Collection Database)

Apr. 1996; In English

Report No.(s): PB96-867510; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the commercial cultivation of algae as a facet of aquaculture. Topics include descriptions and characteristics of algal species, environmental variables affecting productivity, nutritional aspects, infestation and disease, genetic manipulation, and production technology. End product applications examine algae as biomass for energy production, food source for humans, animal feed source, and a source for chemical by-products such as chlorophylls. Harvesting of

algae as a source of single-celled protein is referenced in a related bibliography. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Aquiculture; Algae

19980016862 National Inst. of Environmental Health Sciences, National Toxicology Program, Research Triangle Park, NC USA
NTP Technical Report on the One-Year Initiation/Promotion Study of o-Benzyl-p-Chlorophenol (CAS No. 120-32-1) in Swiss (CD-1 (Trade Name)) Mice (Mouse Skin Study), series

May 1995; 131p; In English

Report No.(s): PB96-162342; NTP-TR-444; NIH/PUB-95-3157; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Toxicology and carcinogenicity studies were conducted by dermal administration of o-benzyl-p-chlorophenol to groups of 50 Swiss (CD-1) mice of each sex to study its effect as an initiator, promoter, and complete carcinogen. Under the conditions of the 1-year mouse skin initiation/promotion study in Swiss (CD-1) mice, o-benzyl-p-chlorophenol was a cutaneous irritant and a weak skin tumor promoter relative to strong promoters such as 12-O-tetradecanoylphorbol-12-acetate. o-Benzyl-p-chlorophenol has no activity as an initiator or as a complete carcinogen.

NTIS

Chlorofluorocarbons; Toxicology; Benzene; Carcinogens

19980016871 National Inst. of Environmental Health Sciences, National Toxicology Program, Research Triangle Park, NC USA
NTP Technical Report on the Toxicology and Carcinogenesis Studies of Benzethonium Chloride (CAS No. 121-54-0) in F344/N Rats and B6C3F1 Mice (Dermal Studies), series

Jul. 1995; 211p; In English

Report No.(s): PB96-162300; NTP-TR-438; NIH/PUB-95-3169; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

Toxicology and carcinogenicity studies were conducted by dermal administration of benzethonium chloride to groups of 60 F344/N rats and 60 B6C3F1 mice of each sex at doses of 0, 0.15, 0.5, or 1.5 mg/kg body weight. Benzethonium chloride was administered to rats in ethanol 5 days per week and doses were adjusted weekly according to the average body weights of the groups. Under the conditions of these 2 year dermal studies, there was no evidence of carcinogenic activity of benzethonium chloride in male or female F344/N rats or in male or female B6C3F1 mice. Exposure of rats and mice to benzethonium chloride by dermal application in ethanol for 2 years resulted in epithelial hyperplasia in male and female rats and mice and sebaceous gland hyperplasia and ulcers in female rats at the site of application.

NTIS

Carcinogens; Sebaceous Glands; Skin (Anatomy); Toxicology

19980016888 National Inst. of Environmental Health Sciences, National Toxicology Program, Research Triangle Park, NC USA
Toxicology and Carcinogenesis Studies of Methylphenidate Hydrochloride (CAS No. 298-59-9) in F344/N Rats and B6C3F1 Mice (Feed Studies), series

Jul. 1995; 299p; In English

Report No.(s): PB96-162615; NTP-TR-439; NIH/PUB-95-3355; No Copyright; Avail: CASI; A13, Hardcopy; A03, Microfiche

Toxicology and carcinogenicity studies were conducted by administration of methylphenidate hydrochloride in feed to groups of 70 F344/N rats of each sex at doses of 0, 100, 500, or 1,000 ppm and to groups of 70 B6C3F1 mice of each sex at doses of 0, 50, 250, or 500 ppm. Under the conditions of these 2-year feed studies, there was no evidence of carcinogenic activity of methylphenidate hydrochloride in male or female F344/N rats receiving 100, 500, or 1,000 ppm. There was some evidence of carcinogenic activity in male and female B6C3F1 mice, based on the occurrence of hepatocellular neoplasms. Treatment of female rats with methylphenidate hydrochloride was associated with a decrease in the incidence of mammary gland fibroadenomas. Administration of methylphenidate hydrochloride to male and female mice resulted in increased incidence of eosinophilic foci in the liver.

NTIS

Carcinogens; Hydrochlorides; Toxicology; Mammary Glands; Neoplasms

19980016890 National Inst. of Environmental Health Sciences, National Toxicology Program, Research Triangle Park, NC USA
Toxicology and Carcinogenesis Studies of Diethylphthalate (CAS No. 84-66-2) in F344/N Rats and B6C3F1 Mice (Dermal Studies) with Dermal Initiation/Promotion Study of Diethylphthalate and Dimethylphthalate (CAS No. 131-11-3) in Male Swiss (CD-1 (Trade

May 1995; 274p; In English

Report No.(s): PB96-162276; NIH/PUB-95-3356; NTP-TR-429; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

Toxicology and carcinogenicity studies were conducted by dermal administration of diethylphthalate to groups of 60 F344/N rats of each sex at doses of 0, 100, or 300 microL and to groups of 60 B6C3F1 mice of each sex at doses of 0, 7.5, 15, or 30 microL. Neat chemical was applied to rats for 5 days per week for 103 weeks and up to 10 animals per group were evaluated after 15 months. Mice received doses in 100 microL of acetone for 5 days per weeks for 103 weeks with a 1 week recovery period, and up to 10 animals per group were evaluated after 15 months. Under the conditions of these 2-year dermal studies, there was not evidence of carcinogenic activity of diethylphthalate in male or female F344/N rats receiving 100 or 300 microL. There was equivocal evidence of carcinogenic activity of diethylphthalate in male and female B6C3F1 mice based on increased incidences of hepatocellular neoplasms, primarily adenomas. In the initiation/promotion model, there was no evidence of initiating or promoting activity of diethylphthalate or dimethylphthalate in male Swiss (CD-1) mice.

NTIS

Phthalates; Toxicology; Carcinogens; Acetone; Neoplasms; Skin (Anatomy)

19980016896 National Inst. of Environmental Health Sciences, National Toxicology Program, Research Triangle Park, NC USA
NTP Technical Report on the Toxicology and Carcinogenesis Studies of t-Butyl Alcohol (CAS No. 75-65-0) in F344/N Rats and B6C3F1 Mice (Drinking Water Studies), series

May 1995; 305p; In English

Report No.(s): PB96-162748; NTP-TR-436; NIH/PUB-95-3167; No Copyright; Avail: CASI; A14, Hardcopy; A03, Microfiche

Toxicology and carcinogenicity studies were conducted by administration of t butyl alcohol in drinking water to groups of 60 F344/N rats of each sex at doses of 0, 1.25, 2.5, or 5 mg/mL for males and 0, 2.5, 5, or 10 mg/mL for females. Groups of 60 B6C3F1 mice of each sex received t-butyl alcohol in drinking water at doses of 0, 5, 10, or 20 mg/mL. Under the conditions of these 2-year drinking water studies, there was some evidence of carcinogenic activity of t butyl alcohol in male F344/N rats based on increased incidences of renal tubule adenoma or carcinoma (combined). There was no evidence of carcinogenic activity of t butyl alcohol in female F244/N rats receiving 2.5, 5 or 10 mg/mL. There was equivocal evidence of carcinogenic activity in male B6C3F1 mice based on marginally increased incidences of follicular cell adenoma or carcinoma (combined) of the thyroid gland. There was some evidence of carcinogenic activity of t-butyl alcohol in female B6C3F1 mice based on increased incidences of follicular cell adenoma of the thyroid gland.

NTIS

Carcinogens; Potable Water; Radicals; Thyroid Gland; Toxicology

19980016900 New York Univ., Medical Center, Tuxedo, NY USA

Suppression of Lymphocyte Signal Transduction by Oxygen Intermediates Annual Report

Flescher, Eliezer, New York Univ., USA; Oct. 1997; 53p; In English

Contract(s)/Grant(s): DAMD17-95-I-5058

Report No.(s): AD-A333384; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Effects of different types of Oxidative Stress (OS) on cellular anti-oxidant mechanisms were compared. Human blood lymphocytes were subjected to: (1) acute exposure to H₂O₂; (2) chronic exposure to H₂O₂; (3) ionizing radiation. Enhanced catalase activity was detected in human peripheral blood T lymphocytes exposed to oxidative stress. Glutathione peroxidase activity and reduced glutathione, vitamin C and vitamin E levels, were not modulated by oxidative stress. Only exposure to hydrogen peroxide at 20 micrometer did not enhance catalase activity in T lymphocytes.

DTIC

Lymphocytes; Signal Transmission; Transducers; Oxidation

52

AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19980014218 NERAC, Inc., Tolland, CT USA

Hydrogels in Medicine. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-854922; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning hydrogels or hydrophilic polymers. References cite technological innovations for the application, preparation, and characterization of hydrogels. Citations focus on drug release and implants. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Gels; Polymers; Drugs

19980014568 National Defence Research Establishment, Avedelningen foer NBC Skydd, Umea, Sweden

Pesticide Fire: A Human Health Hazard? Toxicological Assessment of Pesticide Pyrolysis Products

Magnusson, B., National Defence Research Establishment, Sweden; Aug. 1996; 36p; In English

Report No.(s): PB97-164792; FOA-R-96-00273-4.9-SE; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The intention of the present work is to evaluate the toxic health effects in humans from the formed pyrolysis products and to compare the results with the parental warehouse chemicals. The report will also give a propose of procedure for a toxicological assessment. In this study consideration is given to toxicological effects in humans after inhalation exposure to toxic substances from pyrolysis. The results disclose hazards of lethal injury within a considerable area downwind the pesticide fire. The pyrolysis scenario represents a fire where approximately 1/3 of the chemicals are released unchanged in the air and 1/3 are totally decomposed to yield new toxic products. Some of the pesticides were altered by heating to more toxic analogues.

NTIS

Pyrolysis; Respiration; Toxicity; Wind Direction

19980015147 Hahnemann Medical Coll. and Hospital, Dept. of Anatomy, Philadelphia, PA USA

Cerebellar Circuit Mechanisms Which Accompany Coordinated Limb Trajectory Patterns in the Rat: Use of a Model of Spontaneous Changes Final Report, 15 Feb. 1993 - 14 Feb. 1997

Smith, Sherry, Hahnemann Medical Coll. and Hospital, USA; Feb. 1997; 4p; In English

Contract(s)/Grant(s): F49620-93-I-0136; AF Proj. 2312

Report No.(s): AD-A329702; AFOSR-TR-97-0506; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

This project was designed to evaluate the effect of estrous hormones on function of the olivo-cerebellar circuitry in association with improved motor performance. Towards this end rats were chronically implanted with arrays of microwires to record from the dorsal accessory olive (rDAO) and its target, Purkinje cells in the paravermal cerebellum. In many cases, simultaneous recordings were carried out from as many as 48 neurons in both areas during treadmill locomotion tasks used to evaluate concomitant sensorimotor performance. The justification for these studies comes from the findings that elevations in endogenous estrous hormones across the estrous cycle are associated with marked improvements in limb trajectory. Our fundings suggest that the ability of a rat to maintain treadmill position on a variable speed treadmill paradigm is improved on the night of behavioral estrus, following elevations in both estrous hormones, estradiol and progesterone.

DTIC

Cerebellum; Cerebral Cortex; Sensorimotor Performance; Targets; Trajectories; Treadmills

19980015214 NERAC, Inc., Tolland, CT USA

Hypothermia. (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864657; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning cold stress, cold tolerance, thermal homeostasis, thermoregulation, physiological effects, exposure, and cold water immersion in reference to hypothermia. Antiexposure equipment, cold weather training, and winter survival in emergency situations are discussed. Drug antidotes, prophylaxis, and microwave irradiation for cold injury syndrome are also presented.

NTIS

Bibliographies; Stress (Physiology); Hypothermia; Cold Tolerance; Homeostasis

19980015348 Stanford Univ., Dept. of Computer Science, Stanford, CA USA

Construction of Normative Decision Models Using Abstract Graph Grammars

Egar, J. W., Stanford Univ., USA; Mar. 1994; 247p; In English

Contract(s)/Grant(s): NLM-LM-05157; NLM-LM-07033; NLM-LM-05208; NLM-LM-05305

Report No.(s): Stan-CS-TR-94-1513; KSL-94-17; Copyright Waived; Avail: CASI; A11, Hardcopy; A03, Microfiche

This dissertation addresses automated assistance for decision analysis in medicine. In particular, I have investigated graph grammars as a representation for encoding how decision-theoretic models can be constructed from an unordered list of concerns. The modeling system that I have used requires a standard vocabulary to generate decision models, the models generated are qualitative, and require subsequent assessment of probabilities and utility values. This research has focused on the modeling of the qualitative structure of problems given a standard vocabulary and given that subsequent assessment of probabilities and utilities is possible. The usefulness of the graph-grammar representation depends on the graph-grammar formalism's ability to describe a broad spectrum of qualitative decision models, on its ability to maintain a high quality in the models it generates, and on its clarity in describing topological constraints to researchers who design and maintain the actual grammar. I have found that graph grammars can be used to generate automatically decision models that are comparable to those produced by decision analysis.

Author

Decision Making; Probability Theory; Computer Systems Programs

19980015400 Iowa Univ., Dept. of Internal Medicine, Iowa City, IA USA

Grain Dust Exposure: Physiologic and Biologic Correlates *Final Report*

Jagiello, P. J., Iowa Univ., USA; Schwartz, D. A., Iowa Univ., USA; 1996; 6p; In English

Report No.(s): PB97-207062; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Studies were conducted to determine whether inhalation of aqueous grain dust extract causes inflammation primarily localized in the airways and is associated with airflow obstruction; to determine how host factors such as age, and atopic status modulate the duration, intensity, and severity of these effects; and to study the results of repeated exposure in relation to physiologic and biologic tolerance. These studies demonstrated that extracts of grain dust are biologically active, able to produce acute physiologic changes as well as cause acute airway inflammation. Individuals exposed to grain dust during the handling or processing of grain are therefore at increased risk for the development of acute airflow obstruction and airway inflammation if exposed to significant levels of the dust. Acute physiologic and inflammatory responses following grain dust inhalation were associated with the concentration of endotoxin contained in the bioaerosol. The authors suggest therefore that it may be more important to monitor airborne levels of endotoxin in the work setting rather than total dust levels to minimize the risk of airway injury due to grain dust. While atopy alone plays a minor role in the development of grain dust induced airway disease, bronchial hyperreactivity as a host factor significantly affects the physiologic and biologic response to grain dust.

NTIS

Activity (Biology); Biological Effects; Physiology; Physiological Responses

19980015428 McMaster Univ., Hamilton, Ontario Canada

Tenth Biennial Hypoxia Symposium *Final Report*

Houston, Charles S., Editor, McMaster Univ., Canada; Coates, Geoffrey, Editor, McMaster Univ., Canada; Oct. 1997; 341p; In English; 10th; Biennial Hypoxia Symposium, 18-22 Feb. 1997, Lake Louise, Canada

Contract(s)/Grant(s): DAMD17-96-I-6307

Report No.(s): AD-A330864; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Proceedings of a Symposium on Hypoxia: Women at Altitude. Some topics include: Women, Exercise and Acute Mountain Sickness; Hypoxic Life at the Bottom of the Sea; the Regulatory Role of Myoglobin in Myocardium; Hypoxia and Air Travel; Base HACE: An Introduction; Cerebral Hemodynamics and High Altitude Cerebral Edema; etc.

DTIC

Air Transportation; Altitude Sickness; Hemodynamics; High Altitude; Myocardium; Myoglobin; Physical Exercise

19980015438 Armed Forces Inst. of Pathology, Washington, DC USA

Retrospective Study of HIV Infection in Human Tissues *Final Report, 1 Apr. 1992 - 30 Mar. 1997*

Nelson, Ann M., Armed Forces Inst. of Pathology, USA; Apr. 1997; 7p; In English

Contract(s)/Grant(s): MIPR-92MM2550

Report No.(s): AD-A330526; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

To seek, review identify, and retrieve repository materials (slides, blocks, wet tissues, and information) of cases fulfilling the CDC definition of AIDS in the absence of demonstrable HIV infection Identify cases for potential use in basic research on the chronology of HIV retro viral infection in human tissues.

DTIC

Infectious Diseases; Viral Diseases; Human Immunodeficiency Virus; Immunology; Immune Systems

19980015645 Society for Research on Biological Rhythms, Charlottesville, VA USA

Fifth Meeting of Society for Research on Biological Rhythms Final Report, 1 Mar. 1996 - 28 Feb. 1997

Zuker, Irving, Society for Research on Biological Rhythms, USA; Feb. 1997; 11p; In English

Contract(s)/Grant(s): F49620-96-I-0054; AF Proj. 2312

Report No.(s): AD-A330647; AFOSR-0540; AFOSR-97-0540TR; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Among the features of the meeting worthy of note are the first time appearance of tutorial sessions for graduate and postdoctoral fellows as well as investigators interested in entering new fields of inquiry. At the 1996 meeting the formal models used in chronobiology were enunciated as well the principles of photobiology and the use of genetic and molecular approaches that have come to play an important part in this field. A second innovation was the 'news at 4' feature in which program chairs presented brief synopses of the high points of their sessions. Because there were parallel sessions through much of the meeting this afforded an opportunity for people who were unable to attend a particular session to get an overview of the main points made by the speakers.

DTIC

Rhythm (Biology); Phenology

19980016153 NASA Langley Research Center, Hampton, VA USA

Aerospace Medicine and Biology: A Continuing Bibliography with Indexes

19980223; 27p; In English

Report No.(s): NASA/SP-1998-7011/SUPPL459; NAS 1.21:7011(459); No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report lists reports, articles and other documents recently announced in the NASA STI Database.

Author

Aerospace Medicine; Data Bases; Bioastronautics; Biological Effects; Physiological Effects; Manned Space Flight

19980016531 NASA Langley Research Center, Hampton, VA USA

Aerospace Medicine and Biology: A Continuing Bibliography with Indexes (Supplement 456)

19980112; 32p; In English

Report No.(s): NASA/SP-1998-7011/SUPPL456; NAS 1.21:7011(456); No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report lists reports, articles and other documents recently announced in the NASA STI Database.

Author

Aerospace Medicine; Manned Space Flight; Biotechnology; Biocompatibility; Physiological Factors; Psychological Factors; Bioastronautics

19980016561 Air Force Office of Scientific Research, Bolling AFB, Washington, DC USA

Proceedings of Laser and Noncoherent Ocular Effects: Epidemiology, Prevention, and Treatment

Stuck, Bruce E., Air Force Office of Scientific Research, Bolling AFB, USA; Belkin, Michael, Editor, Air Force Office of Scientific Research, Bolling AFB, USA; Katzir, Abraham, Editor, Air Force Office of Scientific Research, Bolling AFB, USA; Feb. 11, 1997; 239p; In English; Laser and Noncoherent Ocular Effects: Epidemiology, Prevention, and Treatment, 10-11 Feb. 1997, San Jose, CA, USA

Report No.(s): AD-A331096; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

The spread of laser instruments to many fields of human activity and the potential of laser radiation to produce biological damage make certain that laser accidents leading to human injuries will occur. Laser radiation is especially liable to cause accidents since it may be projected over long distances, is often used in the open space, and is sometimes invisible. The potential of laser instruments to be harmful was realized quite early on in their development, and stringent rules were imposed in most countries to minimize injuries. Those regulations are obviously effective since laser injuries are as yet uncommon and the reported cases number only in the hundreds. However, more accidental laser-inflicted traumata are expected in the future as more people are potentially exposed. The situation is especially grave in the military where lasers constitute parts of weapon systems to be used outdoors and are necessarily directed at other people. The hazards are even greater when the potential victims are using collecting optics. The facts regarding laser injuries are well known enough for some military planners to develop laser weapons aimed at producing visual incapacitation of the enemy. Some of these systems have been fielded and used. These potential weapons are based on the fact that the eye is the body organ most vulnerable to laser radiation, especially in the visible and near-infrared wavelengths. This vulnerability is a result of the eye's dioptrics apparatus focusing the light on the retina, thus increasing the energy

concentration many thousand fold. Consequently, almost all of the laser accidents reported thus far involved ocular, mainly retinal, damage.

DTIC

Accidents; Activity (Biology); Collection; Conferences; Damage; Distance; Epidemiology; Laser Beams; Laser Outputs; Laser Weapons; Lasers

19980016641 New Mexico State Univ., Dept. of Civil, Agricultural and Geological Engineering, Las Cruces, NM USA

Microbial Toxicity of Non-Uniform Mixtures of Xenobiotic Chemicals *Final Report, 01 Jul. 1994 - 30 Jun. 1997*

Khandan, N. N., New Mexico State Univ., USA; Jun. 1997; 3p; In English

Contract(s)/Grant(s): F49620-94-I-0366; AF Proj. 3484

Report No.(s): AD-A329750; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The scope of work under the AASERT grant included measuring and analysis of toxicity data for additional chemicals than the parent grant and to validate models developed under the parent grant. A total of 35 new chemicals were assayed using the procedures developed under the parent grant. Non-uniform, multi-component mixture studies were completed and analyzed using the new modeling approach developed during the previous period. A new statistical modeling approach to analyze nonuniform mixture has been formulated and tested on data generated under the parent grant.

DTIC

Microorganisms; Toxicity; Chemical Compounds

19980016772 George Washington Univ. Medical Center, Center for Health Policy Research, Washington, DC USA

Evaluation of Public Health Reporting, Health Data Systems, and Confidentiality Policies and Practices in the States: A Policy Assessment *Final Report*

Spernak, S. M., George Washington Univ. Medical Center, USA; Dec. 31, 1995; 247p; In English

Contract(s)/Grant(s): PHS-282-92-0040/13

Report No.(s): PB97-205082; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

This report locates and describes state laws that govern reporting and confidentiality of public and private health data. It also collects information from government and private officials in states to determine what health data projects are ongoing or planned, and the impact of the state laws on these projects. Seven states were selected as case studies: California, Illinois, Iowa, Missouri, New York, South Carolina, and Utah. The report finds that all states require that certain kinds of patient-level information be reported for public health purposes. The most frequently required categories include: (1) communicable disease; (2) vital statistics; (3) hospital discharge; (4) Alzheimer's Disease; (5) cancer; (6) birth defects; (7) head and spine injury; and (8) chemical exposure. Only three of these (communicable diseases, vital statistics, and hospital discharge data) are required in all seven states. There is considerable variation in the confidentiality laws governing these public health databases and other records containing patient-level data.

NTIS

Laws; Policies; Public Health; Data Systems; Regulations

19980016815 Institut Franco-Allemand de Recherches, Saint-Louis, France

Comparison of Mid Ear Canal (MIRE) and Tympanum (Ear Simulator) Located Measurements on an Artificial Head for the Assessment of an Earmuff in Impulse Noise Exposure

Franke, R., Institut Franco-Allemand de Recherches, France; Parmentier, G., Institut Franco-Allemand de Recherches, France; 1995; 23p; In English

Report No.(s): PB96-132972; ISL-PU-320/95; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Measurements of the response and the dynamics of a typical MIRE frame were performed using impulse noises in free field. The Insertion Loss (IL) of a Peltor H7A muff was determined using a MIRE device mounted on the ISL Artificial Head (AH) in high level impulse and low level steady state noise exposure (grazing incidence), and compared to the IL obtained simultaneously from the AH itself. Additionally, these results were likened to data obtained with the subjected method (REAT) and derived from the literature.

NTIS

Ear Protectors; Noise Reduction; Steady State; Ear; Canals

19980016840 Yale Univ., School of Medicine, New Haven, CT USA

Metal Fume Fever Final Report

Beckett, W. S., Yale Univ., USA; Chen, L. C., Yale Univ., USA; Cosma, G., Yale Univ., USA; Fine, J., Yale Univ., USA; Garte, S., Yale Univ., USA; Jul. 26, 1996; 41p; In English

Report No.(s): PB97-206379; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The acute response to zinc-oxide (1314132) fumes in naive human subjects and galvanized sheet metal workers was investigated. Of 12 naive subjects, ten experienced a mild fever after a 2 hour exposure to zinc-oxide fume at 5mg/m³ (the OSHA permissible exposure limit) or 2.5mg/m³. Metal fume fever symptoms were significantly increased 6 and 9 hours after a 5mg/m³ exposure. The most common symptoms were fatigue, muscle ache, and cough. Elevated white blood cell counts were also seen. Those who experienced mild symptoms and fever developed tolerance of these effects with repeated exposures on subsequent days. Sheet metal workers with ongoing low level exposure showed tolerance to exposure at 5mg/m³. However, zinc-oxide exposure in these individuals induced elevated levels of interleukin-6 in the blood. The findings demonstrated that mild symptoms and fever can occur in previously unexposed men and women several hours after they breathe ultrafine zinc-oxide fumes for only 2 hours at the 5.0mg/m³ level. This occurred in a high proportion of healthy and normal individuals.

NTIS

Human Beings; Immune Systems; Leukocytes; Signs and Symptoms; Blood; Females; Fever; Muscles

19980016863 Naval Postgraduate School, Monterey, CA USA

Analysis of Small Business' Perspective on the Electronic Data Interchange Acquisition Reform

Hagen, Paul W., Naval Postgraduate School, USA; Jun. 1997; 98p; In English

Report No.(s): AD-A333374; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

This thesis examines small business' perception of utilizing Electronic Data Interchange (EDI) as a means to conduct business. The general concept and history of EDI is discussed along with a synopsis of current Government EDI systems in use. The results of two surveys are analyzed to provide an insight on the effect the Federal Acquisition Streamlining Act is having on small business' opportunity to obtain Government Contracts. Additionally, interviews were conducted with several Government personnel to get their opinions on the progress of EDI in the workplace. The major conclusion drawn is that the majority of small businesses are willing to utilize EDI as a means to conduct business. But in its current form (i.e. FACNET) small businesses find it difficult to use and too expensive. The need to use a simpler and more cost-effective means is necessary to ensure that all small businesses have the opportunity to compete for Government contracts without cutting into their profit margins.

DTIC

Data Management; Data Acquisition; Information Transfer

54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.

19980012534 Army Aeromedical Research Lab., Aircrew Protection Div., Fort Rucker, AL USA

Pressures Measured Under Earmuffs Worn by Human Volunteers During Exposure to Freefield Blast Overpressures Final Report

Patterson, James H., Jr., JAYCOR, USA; Mozo, Ben T., Army Aeromedical Research Lab., USA; Gordon, Elmaree, Army Aeromedical Research Lab., USA; Canales, Jesus R., Army Aeromedical Research Lab., USA; Johnson, Daniel L., Edgerton, Germe-shausen and Grier, Inc., USA; Aug. 1997; 106p; In English

Contract(s)/Grant(s): DAMD17-88-C-8141

Report No.(s): AD-A331738; USAARL-98-01; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

A series of studies to determine the maximum safe exposures to blast overpressure (high intensity impulse noise) were conducted at the Blast Overpressure Test Site on Kirtland Air Force Base, NM, by EG&G Management Systems, Inc., Albuquerque, NM. The studies focused on temporary changes in the threshold of hearing in volunteers wearing earmuffs for hearing protection. From these studies, maximum safe exposure levels have been derived in terms of the parameters of the freefield blast signatures. In collaboration with the contractor researchers at the test site, a field measurement team from the U.S. Army Aeromedical Research Laboratory (USAARL) recorded the pressure signatures under the earmuffs of a subset of the volunteers participating in the studies. These pressure signatures are representative of the effective exposure stimuli arriving at the ears of the volunteers. This report presents the results of these under-the-muff measurements. An analysis of indicators of auditory hazard derived from

the pressure-time signatures under the muffs indicated that weighted sound exposure level (SEL) measures and peak levels corrected for B-duration are good indicators of auditory hazard when a correction factor of 1 to 5 dB per 10 fold change in number of impulses is used as the number-intensity trading rule.

DTIC

Hazards; Hearing; High Impulse; Noise Intensity; Protection

19980014104 Anthropology Research Project, Yellow Springs, OH USA

Reconciling Anthropometric and Tailoring Measurements for Clothing Design *Final Report, 2 Aug. 1996 - 27 May 1997*

Bradtmiller, Bruce, Anthropology Research Project, USA; May 27, 1997; 147p; In English

Contract(s)/Grant(s): SPO100-95-D-1010

Report No.(s): AD-A331099; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Over the years, the U.S. military services have acquired a large body of anthropometric data, much of it for application to the design and sizing of military clothing. These data have not, however, been as fully utilized as they might have been because a number of measurement definitions used by anthropologists are unfamiliar to expert tailors who traditionally measure the same dimensions or their equivalents quite differently. The goal of this research was to document the relationship between anthropological measurements and tailoring measurements, not only identifying similarities and differences between measurement techniques, but quantifying the relationship mathematically, so it would be possible to take an anthropological measurement and convert it to an equivalent tailoring measurement. A group of 127 U.S. Army recruits (60 males and 67 females) was measured for some two dozen dimensions relevant to military dress clothing, using both anthropological and tailoring techniques. Resulting values were compared and differences between the two techniques were quantified. The final product is a set of four conversion tables which convert anthropological measures into tailoring measures and vice versa for men and for women.

DTIC

Clothing; Females; Males

19980015365 NERAC, Inc., Tolland, CT USA

Night Vision and Dark Adaptation. (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864012; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the physiological aspects of night vision and dark adaptation. The reports pertain to performance in low light level illumination of motor vehicle operators, pilots, military personnel, and others who are subject to reduced lighting conditions. Some citations report on research on the response and adaptation of visual sensory functions of humans and animals under low light levels. The data can be used in human engineering to define night vision limits and capabilities, or to increase conspicuity of objects or surroundings to assist in the performance of tasks at night.

NTIS

Bibliographies; Night Vision; Dark Adaptation; Visual Perception; Illuminating

19980015408 NERAC, Inc., Tolland, CT USA

Repetitive Motion Disorders. (Latest Citations from the ABI/Inform Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864061; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning repetitive motion disorders in the workplace. Work-related musculoskeletal disorders, repetitive strain injury, and cumulative trauma disorders and their effects on employee performance and productivity are discussed. Various policies, guidelines, and programs dealing with this problem are reviewed. Solutions and recommendations for reducing this risk within various work environments are provided.

NTIS

Bibliographies; Human Factors Engineering; Personnel Management; Injuries; Musculoskeletal System

19980016670 NERAC, Inc., Tolland, CT USA

Anthropometry (Latest Citations from the Aerospace Database)

Dec. 1995; In English; Page count unavailable

Report No.(s): PB96-855903; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning methods used to calculate important anthropometric and biomechanical parameters pertaining to human performance. Topics include recent advantages in analysis, methods, devices and techniques for measurement of human biomechanical activity and theoretical research into the applicability of analytical mechanics to human motion problems. Optimal performance of human motion and optimal modeling for specific human motion are discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Anthropometry; Bibliographies

19980016764 Michigan Univ., Transportation Research Inst., Ann Arbor, MI USA

Suggested Procedures and Acceptance Limits for Assessing the Safety and Ease of Use of Driver Information Systems *Final Report, Sep. 1991 - Nov. 1993*

Green, P., Michigan Univ., USA; Dec. 1995; 72p; In English

Report No.(s): PB96-165386; UMTRI-93-13; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report (1) identifies measures of the safety and ease of use of driver information systems, (2) describes test protocols for assessing safety and ease of use, and (3) identifies levels of acceptance. Only the driver interface is considered, not system safety considerations. Two protocols are described: an initial on-road test to assess the basic interface, and flow-on surveys at driver licensing offices after only small changes are made to the interface. The on-road test involves use of an instrumented car. From the data collected, measures of the standards deviation of lane position, mean speed, speed variance, the number and duration of eye fixations, and interface-specific performance measures (e.g., the number of turn error) can be obtained. For each measure, three levels of acceptance are specified: best expected, desired/planned, and worst case.

NTIS

Eye (Anatomy); Information Systems; Safety Factors; Systems Engineering; Variance (Statistics)

19980016806 Michigan Univ., Transportation Research Inst., Ann Arbor, MI USA

Human Factors of In-Vehicle Driver Information Systems: An Executive Summary *Final Report, Sep. 1991 - May 1993*

Green, P., Michigan Univ., USA; Boehm-Davis, D., Michigan Univ., USA; Dec. 1995; 46p; In English

Report No.(s): PB96-165097; UMTRI-93-18; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report summarizes a multiyear program concerning driver interfaces for future cars. The goals were to develop (1) human factors guidelines, (2) methods for testing safety and ease of use, and (3) a model that predicts human performance with these systems. After reviewing the human factors literature, focus groups were conducted to assess driver attitudes towards new information systems. Next, the extent to which these systems might reduce traffic accidents, improve traffic operations, and satisfy driver needs and wants was examined. Based on that effort and contract requirements, five functions were selected for further evaluation - route guidance, traffic information, road hazard warning, cellular phone, and vehicle monitoring.

NTIS

Human Factors Engineering; Human Performance; Information Systems; Traffic

19980016891 Michigan Univ., Transportation Research Inst., Ann Arbor, MI USA

Preliminary Human Factors Design Guidelines for Driver Information Systems *Final Report, Sep. 1991 - May 1993*

Green, P., Michigan Univ., USA; Levison, W., Michigan Univ., USA; Paelke, G., Michigan Univ., USA; Serafin, C., Michigan Univ., USA; Dec. 1995; 112p; In English

Report No.(s): PB96-165089; UMTRI-93-21; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This document is written for the designers of IVHS-related driver information systems. It describes how to make those systems safe and easy to use for ordinary drivers. These guidelines are based on experimental work carried out as part of this project, the literature, and the authors' human factors experience. This document includes a description of its objectives, general design principles, and guidelines for the design of manual controls, spoken input, visual displays, auditory displays, destination entry, visual displays for navigation, auditory displays for navigation, traffic information, car phones, vehicle monitoring, IVSAWS (a hazard warning system), interface integration, as well as an extensive reference section. For most guidelines, a commentary and examples of how they should be applied are provided.

NTIS

Information Systems; Human Factors Engineering; Design Analysis; Experimentation

MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

19980015380 Consiglio Nazionale delle Ricerche, Inst. di Analisi dei Sistemi ed Informatica, Rome, Italy

Pixel Based Random Model to Generate Aggregated Binary Images

Manolopoulos, Y., Consiglio Nazionale delle Ricerche, Italy; Nardelli, E., Consiglio Nazionale delle Ricerche, Italy; Proietti, G., Consiglio Nazionale delle Ricerche, Italy; Vassilakopoulos, M., Consiglio Nazionale delle Ricerche, Italy; Feb. 1995; 12p; In English

Report No.(s): PB96-153333; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Traditional random models for binary images proposed in the literature show their limits in generating in a satisfactory way images having a desired aggregation among their components. The authors introduce in their paper a new random model that, starting from the traditional pixel independent model, provides the possibility to mould the image until a given aggregation level is reached. The authors show how the flexibility of this new model is useful in an applicative context, especially whenever it is needed to focus on subclasses of homogeneous images, as for example landuse or topographical maps.

NTIS

Image Processing; Models; Pixels; Algorithms

19980016028 Consiglio Nazionale delle Ricerche, Ist. di Analisi dei Sistemi ed Informatica, Rome, Italy

Probabilistic Models for Images and Quadrees: Differences and Equivalences

Nardelli, E., Consiglio Nazionale delle Ricerche, Italy; Proietti, G., Consiglio Nazionale delle Ricerche, Italy; Jan. 1995; 10p; In English

Report No.(s): PB96-153341; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

In the paper the authors compare from an analytical point of view two random models for binary images, namely the pixel based model and the node based model. The authors prove that a partial equivalence, referring to the structure of the quadrees representing the image, can be claimed between them, while the authors show that the two models produces a different probability space for what regards the images.

NTIS

Image Processing; Trees (Mathematics); Probability Theory; Mathematical Models; Image Analysis

COMPUTER OPERATIONS AND HARDWARE

Includes hardware for computer graphics, firmware, and data processing. For components see 33 Electronics and Electrical Engineering.

19980012547 NERAC, Inc., Tolland, CT USA

IBM PS-2 Microcomputers: Micro Channel Bus Hardware and Software. (Latest citations from The Computer Database)

Jan. 1996; In English

Report No.(s): PB96-859830; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning IBM's Personal System 2 (PS-2) and its associated Micro Channel architecture. The Micro Channel bus connects central processing unit (CPU) boards, memory boards, and add-on boards to each other in the IBM PS-2. The Micro Channel architecture increases reliability, enables data transfer in a multi-tasking multi-user environment, and provides better overall performance than previous personal computer bus structures. The performance includes increased bus speed from 8 mHz to 10 mHz, input-output path from 16 bit to 32 bit, and triple the burst transfer rate. A separate bibliography covers the OS-2 operating system used with the IBM PS-2. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; IBM Personal Computers; Architecture (Computers)

19980012764 California Univ., San Diego, La Jolla, CA USA

Architecture Studies in Parallel Optoelectronic Computing *Final Report, 15 Nov. 1992 - 15 May 1997*

Esener, Sadik C., California Univ., San Diego, USA; Oct. 1997; 50p; In English

Contract(s)/Grant(s): F49620-93-I-0057; AF Proj. 2305

Report No.(s): AD-A332001; AFOSR-97-0633TR; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The 3D two-photon memory was found to be well suited for very large databases with low write requirements because of its potential capacity, raw bandwidth and random access capability. It was determined that performance can be significantly improved by utilizing and accessing feature termed bi-orthogonal access, a feature which allows both record and field parallel access to be supported simultaneously. A metric termed bit retrieval efficiency was devised to evaluate the optimality of relational database operations performed with a bi-orthogonally accessed 3D optical memory. The results of this analysis indicate that the throughput and the random access capability of a memory both affect the performance of relational database machines. A shortcoming that all massively parallel access optical memories have in terms of this applications is that an entire page of records has to be retrieved even if only one record is desired. From this point they appear to have reduced random access capabilities. We have focused on the theoretical feasibility of obtaining 2-D photonic bandgap from a two-dimensional honeycomb dielectric lattice structure, with a particular emphasis on the effect of having a finite rod length. We have also started investigating the impact of the inclusion of active device structures (e.g., VCSELs) into the photonic crystals.

DTIC

Relational Data Bases; Optical Memory (Data Storage); Dielectrics; Honeycomb Structures

19980013652 NERAC, Inc., Tolland, CT USA

Associative Memories. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Jan. 1996; In English

Report No.(s): PB96-859798; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning associative memory devices and systems, used in communication and information systems. Memory systems utilizing semiconductor, optical, electronic, magnetic, and superconductor techniques are discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Computer Storage Devices

19980013653 NERAC, Inc., Tolland, CT USA

Virtual Machines. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Jan. 1996; In English

Report No.(s): PB96-859855; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning virtual machines and devices. References describe virtual computers and virtual processors, and their applications in parallel processing, inter-system communications, flexible computing systems, and signal analysis. The design and concepts of virtual memory, connection, data and network structures, control, interface, and operation systems are presented. The techniques of adding and changing, program recovery from faults and interrupts, and suspend and resume controls are included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Virtual Memory Systems

19980014229 NERAC, Inc., Tolland, CT USA

Jukeboxes for Optical Disk Storage (Latest Citations from the INSPEC Database)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863287; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This bibliography contains citations concerning the use of jukeboxes to store large amounts of data on optical disks. Jukeboxes are systems that allow automatic selection and loading of disks by multiusers, and networked and remote access. The citations discuss the hardware and software as well as applications such as storage and retrieval of documents and engineering drawings. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Optical Disks

19980014230 NERAC, Inc., Tolland, CT USA

Computer Architectures (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863303; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning computer memory and control architectures for use in data processing systems. Included are patents in parallel, pipeline, data transfer, floating point processor, array processor, fault-tolerant, bus, and digital signal processor architectures. Computer system testability, flexibility, and complexity are discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Architecture (Computers)

19980014526 NERAC, Inc., Tolland, CT USA

Modems. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Apr. 1996; In English; Page count unavailable.

Report No.(s): PB96-868138; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning modems for use in communication systems. Patents discuss modem control, interface, registration, verification, and performance testing. Citations describe phase shift keying, spread spectrum, and full duplex in the design of modems devices. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Modems

19980014814 National Inst. of Standards and Technology, Computer Security Div., Gaithersburg, MD USA

Report on the TMACH Experiment

Flahavin, E., National Inst. of Standards and Technology, USA; Hill, S., Logical Technical Services Corp., USA; Eisen, G., National Inst. of Standards and Technology, USA; Spindler, H., National Inst. of Standards and Technology, USA; Straw, J., National Inst. of Standards and Technology, USA; Jul. 1997; 54p; In English

Report No.(s): PB98-104169; NISTIR-6068; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

In the USA of America, it was felt necessary to understand the European approach to evaluation, and the commercial basis for evaluation that is used in some European nations. On this basis, a high assurance product was selected to undergo the evaluation process in the UK and Germany to learn about the process. The product in question was TMach, being developed by Trusted Information Systems, Inc. This report documents the findings of a multi-National evaluation experiment, funded by the U.S. Advanced Research Projects Agency (ARPA), to explore alternative approaches to security evaluation. The experiment focused on European ITSEC evaluations within the UK and Germany, using the Trusted Mach operating system (developed to target TCSEC B3) at a high level of assurance (E5). The report provides a description of the experiment, its aims and objectives, and provides insight into what has been learned and accomplished so far.

NTIS

ARPA Computer Network; Information Systems; Performance Tests; Architecture (Computers)

19980015107 Carnegie-Mellon Univ., Pittsburgh, PA USA

Security for Network Attached Storage Devices

Gobioff, Howard, Carnegie-Mellon Univ., USA; Gibson, Garth, Carnegie-Mellon Univ., USA; Tygar, Doug, Carnegie-Mellon Univ., USA; Oct. 23, 1997; 22p; In English

Contract(s)/Grant(s): F19628-96-C-0061; N000174-96-K-0002; ARPA Order D306

Report No.(s): AD-A332311; CMU-CS-97-185; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper presents a novel cryptographic capability system addressing the security and performance needs of network attached storage systems in which file management functions occur at a different location than the file storage device. In our NASD system file managers issue capabilities to client machines, which can then directly access files stored on the network attached storage device without intervention by a file server. These capabilities may be reused by the client, so that interaction with the file manager is kept to a minimum. Our system emphasizes performance and scalability while separating the roles of decision

maker (issuing capabilities) and verifier (validating a capability). We have demonstrated our system with adaptations of both the NFS and AFS distributed file systems using a prototype NASD implementation.

DTIC

Computer Information Security; Records Management

19980015133 National Inst. of Standards and Technology, Building Environment Div., Gaithersburg, MD USA

Developing Application Protocols (APs) Using the Architecture and Methods of STEP: Fundamentals of the STEP Methodology

Danner, W. F., National Inst. of Standards and Technology, USA; Jan. 1997; 87p; In English

Report No.(s): PB98-104177; NISTIR-5972; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

STEP has provided an architecture and methods for the development of application protocols (APs). An AP is a standards document (a part of ISO 10303) that provides for communication of information in a well defined application context. The report presents a tutorial for the development and use of APs using the architecture and methods of STEP. It provides definitions, rationales, and examples of the principle components of the STEP architecture as well as their use for a sample population. The sample population is presented using both clear text encoding and an example relational database implementation. The presented definitions, rationales, and example AP provide a foundation for a strategy to develop and use interrelated application protocols (IAPs).

NTIS

Computer Aided Design; Computer Aided Manufacturing; Data Management; Relational Data Bases; Architecture (Computers); Data Transmission

19980015231 NERAC, Inc., Tolland, CT USA

Computer Architecture. (Latest Citations from the Aerospace Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): NASA/TM-96-206847; NAS 1.15:206847; PB96-864137; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)); US Sales Only, Microfiche

The bibliography contains citations concerning research and development in the field of computer architecture. Design of computer systems, microcomputer components, and digital networks are among the topics discussed. Multimicroprocessor system performance, software development, and aerospace avionics applications are also included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Architecture (Computers); Computer Design

19980015232 NERAC, Inc., Tolland, CT USA

Video Display Terminals: Operator Protection and Ergonomics. (Latest Citations from the Computer Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864145; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning video display terminal ergonomics with the emphasis on operator health and productivity. Health effects include posture and vision, radiation, and general occupational stress. Productivity improvement resulting from terminal, keyboard, and workplace design is also examined. Some citations pertain to the emotional stress and psychological effects related to office automation. Proposed laws pertaining to video display terminals and operator health are referenced.

NTIS

Bibliographies; Human Factors Engineering; Data Processing Terminals; Display Devices; Computer Components; Input/Output Routines

19980015361 Carnegie-Mellon Univ., Dept. of Electrical and Computer Engineering, Pittsburgh, PA USA

Silicon-Micro-Disk Arrays for Data Storage Final Report, 1 Mar. 1994 - 30 Jul. 1997

Carley, L. Richard, Carnegie-Mellon Univ., USA; Fedder, Gary, Carnegie-Mellon Univ., USA; Sep. 30, 1997; 7p; In English
Contract(s)/Grant(s): F49620-94-I-0192

Report No.(s): AD-A331268; TR-1-52198-08; AFOSR-TR-97-0556; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

We envision arrays of silicon disk drives which are completely manufactured by planar lithographic techniques that can vastly decrease the size, weight, power requirements, cost, latency of access, and failure rate, of data storage systems. In this project we

have demonstrated MEMS actuators that achieve greater than or equal 1% swept area. to achieve this goal, we have developed a custom MEMS process that starts with a standard CMOS foundry. We have achieved multiconductor movable beams that are 1.2 micron wide and 5 micron tall with 1.2 micron spaces between beams. In addition, our MEMS process allows the creation of upward facing platinum Spindt field emission tips used for reading and writing data. Using a commercial STM system, we have demonstrated the writing of 3 nm - 25 nm diameter pits in a carbon thin film media. Finally, we have used the MEMS positioner to demonstrate STM operation with the platinum tips fabricated on the MEMS actuators. We project that these MEMS actuators and platinum STM tips, combined with our designs for carbon thin film media, could be used to create a 10 GB WORM data storage array that requires only 1 cm x 1 cm x 2 mm of physical space.

DTIC

Data Storage; Electromechanical Devices; Magnetic Disks; Silicon

19980015362 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Synthesis of Speed Independent Circuits from STG-Unfolding Segment, series

Semenov, A., Newcastle-upon-Tyne Univ., UK; Yakovlev, A., Newcastle-upon-Tyne Univ., UK; Pastor, E., Universidad Politecnica de Catalunya, Spain; Pena, M. A., Universidad Politecnica de Catalunya, Spain; Cortadella, J., Universidad Politecnica de Catalunya, Spain; Jan. 1997; 22p; In English

Report No.(s): PB97-140974; TRS-565; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper presents a novel technique for synthesis of speed-independent circuits. It is based on partial order representation of the state graph called STG-unfolding segment. The new method uses approximation technique to speed up the synthesis process. The method is illustrated on the basic implementation architecture. Experimental results demonstrating its efficiency are presented and discussed.

NTIS

Computer Storage Devices; Computer Systems Performance

19980015379 NERAC, Inc., Tolland, CT USA

Dynamic Random Access Memories. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-863931; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning the design and fabrication of dynamic random access memories (DRAM). Patents are included for integrated circuit architectures, sense and refresh circuitry, and cell design and testing. Memory error detection and correction methods, and fault-tolerant devices are discussed.(Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Random Access Memory

19980015407 NERAC, Inc., Tolland, CT USA

Winchester Disks and Drives. (Latest Citations from the INSPEC Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864764; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, performance, and testing of Winchester disks and drives. The reliability of drive devices and controllers is discussed. The citations also review techniques for interfacing with existing systems, and explore the criteria and tradeoffs involved in disk selection.

NTIS

Bibliographies; Computer Storage Devices; Magnetic Disks; Design Analysis; Performance Prediction

19980015434 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Partial Order Based Approach to Synthesis of Speed-Independent Circuits

Semenov, A., Newcastle-upon-Tyne Univ., UK; Yakovlev, A., Newcastle-upon-Tyne Univ., UK; Pastor, E., Universidad Politecnica de Catalunya, Spain; Pena, M. A., Universidad Politecnica de Catalunya, Spain; Cortadella, J., Universidad Politecnica de Catalunya, Spain; Jan. 1997; 30p; In English

Report No.(s): PB97-140966; TRS-566; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The aim of this paper is to introduce a novel technique for synthesis of speed-independent circuits from their Signal Transition Graph specifications. The new method uses partial order in the form of the STG-unfolding segment to derive the logic implementation. It is based on a new notion of slice, which localizes the behavior of a particular signal instance in a structural fragment of the segment. Two approaches are explained in this paper: exact and approximation. Within the approximation approach two strategies for cover derivation are considered. The method is applied to synthesis in three main implementation architectures. The experimental results show the power of the approximation approach in comparison with the existing methods.

NTIS

Computer Programming; Computer Systems Simulation

19980015933 National Inst. of Standards and Technology, Advanced Systems Div., Gaithersburg, MD USA

Operating Principles of MultiKron Virtual Counter Performance Instrumentation for MIMD Computers

Mink, A., National Inst. of Standards and Technology, USA; Nov. 1995; 24p; In English

Report No.(s): PB96-131529; NISTIR-5743; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The MultiKron and MultiKron II performance instrumentation provided both Trace sampling and Resource Counters, but required a separate measurement data collection facility for collecting sample data. Although providing a large amount of measurement detail, trace sampling has the disadvantage of requiring additional investment in logic, wires and space to provide for the collection facilities. An alternative measurement approach that would eliminate the need for a collection facility, and its associated cost, is to eliminate Trace sampling and only provide for a very large number of Resource Counters, at the cost of some loss of measurement detail. The MultiKron virtual counter (MultiKron vc) performance instrumentation chip provides such a feature. Similar in concept to virtual memory, thousands of virtual counters are available but only a small number are real counters that can be active at any one time. Unlike virtual memory, where swapping is transparent to the programmer, due to extra hardware and kernel software support, swapping of counter blocks must currently be handled by the programmer.

NTIS

Data Acquisition; Circuit Boards; Counters; Computer Programs; Performance Tests; MIMD (Computers)

19980016569 SRI InterNational Corp., Menlo Park, CA USA

Smart Optical Memory Final Report, 30 Sep. 1993 - 31 Mar. 1997

Kachru, Ravinder, SRI InterNational Corp., USA; Sep. 1997; 53p; In English

Contract(s)/Grant(s): F49620-93-C-0076; AF Proj. A269

Report No.(s): AD-A330667; SRI-PYU-5310; AFOSR-TR-97-0535; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Sequential computers are fast approaching the fundamental physical limits of performance. Computers capable of parallel processing are being used to improve performance. These parallel computers or processors require fast, dense, affordable, intelligent main and cache memories. SRI InterNational is developing a high density, random access, smart time-domain optical memory (TDOM) to meet the above needs. SRI performed experiments to examine the practicality of the photon echo approach to serial data storage. SRI successfully demonstrated a storage density of 2 Kbits in frequency channels 110 MHz wide in Eu doped Y2SiO5 crystal at an input/output speed of 40 MHz. No measurable cross-talk between adjacent frequency channels was observed. From these measurements, a memory density of $6.25 \times 10(\exp 4)$ bits/focal spot was inferred, which is the highest storage density demonstrated to date. This work shows that this serial architecture for optical data storage is extremely valuable for applications such as all-optical switching. SRI InterNational also performed a feasibility study to examine the use of stimulated echo technique for parallel optical data storage. In a proof-of-principle experiment, a total of 100 single-page holograms were stored and later recalled successfully. The results suggest a frame transfer rate exceeding $10(\exp 3)$ frames per second along with a high storage density. The experimental results from this project clearly demonstrate the feasibility of the TDOM for high speed, high density, optical data storage application using existing technology.

DTIC

Optical Memory (Data Storage); Optical Switching; Parallel Computers; Parallel Processing (Computers); Random Access; Sequential Computers; Holography

19980016654 NERAC, Inc., Tolland, CT USA

Cache Memories. (Latest Citations from the INSPEC Database)

Nov. 1995; In English; Page count unavailable.

Report No.(s): PB96-855309; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning development, design, and applications of a special computer memory called a cache memory. Also known as instrument cache, this memory space is used as an auxiliary memory for often-used instructions so that central processor traffic can be reduced. The citations examine alternate applications, hit and miss rates, and use of cache memory devices in specific machines. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Memory (Computers)

19980016660 NERAC, Inc., Tolland, CT USA

CD-ROM: Multimedia Systems and Optical Publishing. (Latest Citations from the INSPEC Database)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-856174; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development and advances of CD-ROM technology for services in multimedia information and optical publishing. CD-ROM systems disseminate vast volumes of data-text, graphics, sound, and video quickly and accurately in cost-effective formats. Citations discuss CD-ROM hardware and software, drives, and databases. Also discussed are CD-ROM magazines, periodicals, newspapers and newsletters, books, and art galleries. Applications in consumer and library markets, education, and entertainment are examined. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; CD-ROM; Multimedia

19980016857 NERAC, Inc., Tolland, CT USA

Magnetic Disk Drives. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Jan. 1996; In English

Report No.(s): PB96-859442; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning magnetic disk drives used for data storage and retrieval. Citations are included for subsystem mechanization, including head positioning and support assemblies, loading mechanisms, servo circuits, controllers, and actuators. Manufacturing methods and devices, and peripheral equipment for both floppy and hard disk drives are considered.

NTIS

Actuators; Circuits; Claiming; Controllers; Data Retrieval; Data Storage; Magnetic Disks; Manufacturing

61

COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM.

19980012542 NERAC, Inc., Tolland, CT USA

Error Detection Codes. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English

Report No.(s): PB96-859970; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning design, development, and implementation of error detection codes for use in computer software and hardware. Topics include a discussion of their effectiveness, estimates of reliability gain, models and the state-of-the-art technology. Various applications such as error detection codes for binary data, picture signals, package failures, and detection and diagnosis of software malfunctions are also presented. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Error Detection Codes; Proving

19980012555 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Fixing the "Broken Link" Problem: The W3Objects Approach

Ingham, D. B., Newcastle-upon-Tyne Univ., UK; Caughey, S. J., Newcastle-upon-Tyne Univ., UK; Little, M. C., Newcastle-upon-Tyne Univ., UK; Apr. 1997; 18p; In English

Report No.(s): PB97-176788; TRS-591; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper presents a model for the provision of referential integrity for Web resources which supports resource migration and tolerates site and communication failures. The approach is object-oriented, highly flexible, completely distributed, and does not require any global administration. An attractive feature of the authors' design is the provision of a lightweight mechanism which provides referential integrity, and which may be customized on per resource basis to provide increased fault-tolerance and performance. The authors' system follows an evolutionary approach, supporting parallel operation with the existing Web, allowing users to gain the additional benefits of referential integrity while allowing continued access through trusted software components.

NTIS

World Wide Web; Data Links; Systems Engineering; Communication Networks; Access Control

19980012559 Technische Univ., Centre for Telematics and Information Technology, Eindhoven, Netherlands

Testing Theory in Practice: A Simple Experiment

Terpstra, R., Technische Univ., Netherlands; Pires, L. F., Technische Univ., Netherlands; Heerink, L., Technische Univ., Netherlands; Tretmans, J., Technische Univ., Netherlands; 1997; ISSN 1381-3625; 23p; In English; InterNational Workshop on Applied Formal Methods in System Design, 17-19 Jun. 1996, Maribor, Slovenia

Report No.(s): PB97-204507; CTIT-TR-96-21; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The goal of this paper is to show the viability and feasibility of the FMCT framework by conducting a concrete experiment with a simple, example protocol. This experiment shows how the abstract concepts defined in FMCT (e.g., test context, points of control and observation, abstract test case) can be instantiated with concrete concepts (e.g., programming interface, executable test case). The correspondence between the abstract and concrete concepts is investigated in order to see which concepts can be easily instantiated, and which concepts are critical in the application of FMCT to realistic testing situations.

NTIS

Formalism; Computer Programming; Viability; Feasibility Analysis; Interprocessor Communication

19980012560 Technische Univ., Centre for Telematics and Information Technology, Twente, Netherlands

Study of Routing Algorithms for Multiparty Connections in ATM

Unmehopa, M. R., Technische Univ., Netherlands; 1997; 136p; In English

Report No.(s): PB97-204465; CTIT-TR-96-16; Copyright Waived; Avail: CASI; A07, Hardcopy; A02, Microfiche

This report deals with routing algorithms for multiparty connections in ATM. The motivation for multiparty calls come from the recognition that there is a wide class of applications that requires this call configuration. We consider multiparty calls as the general communication mode. We start our investigation by studying the theoretical background. Multiparty calls can be modeled as the Steiner Problem in Networks. We study the behavior of these algorithms and will look at heuristic solutions. We present measures to characterize these various algorithms, the efficiency of their solutions, and the execution times. In order to do this, we performed simulations, using a tool called MCRESIM.

NTIS

Packet Transmission; Broadband; Experimentation; Algorithms; Mathematical Models

19980012615 National Inst. of Standards and Technology, Gaithersburg, MD USA

IML++ v.1.2 Iterative Methods Library Reference Guide

Dongarra, J., Oak Ridge National Lab., USA; Lumsdaine, A., Notre Dame Univ., USA; Pozo, R., National Inst. of Standards and Technology, USA; Remington, K. A., National Inst. of Standards and Technology, USA; Jun. 1996; 43p; In English

Report No.(s): PB96-195219; NISTIR-5860; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Iterative Methods Library, IML++, is a collection of algorithms implemented in C++ for solving both symmetric and nonsymmetric linear systems of equations by using iterative techniques. The goal of the package is to provide working code which separates the numerical algorithm from the details of the matrix/vector implementation. The separation allows the same algorithm to be used without modification, regardless of the specific data representation.

NTIS

Algorithms; Computer Programs; Iterative Solution; Matrices (Mathematics); Vectors (Mathematics); C++ (Programming Language)

19980012715 National Inst. of Standards and Technology, Gaithersburg, MD USA

CIM Framework Experience Report for 1996

Flater, D., National Inst. of Standards and Technology, USA; Barkmeyer, E., National Inst. of Standards and Technology, USA; Wallace, E., National Inst. of Standards and Technology, USA; Denno, P., National Inst. of Standards and Technology, USA; Iuliano, M., National Inst. of Standards and Technology, USA; Sep. 1997; 37p; In English
Report No.(s): PB98-103914; NISTIR-6057; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The National Advanced Manufacturing Testbed (NAMT) Framework prototype is a distributed, object-oriented manufacturing system that serves as a testbed and trial implementation for emerging industry-developed specifications. This report documents the findings of the Framework team in 1996 with respect to version 1.3 of SEMATECH's CIM Framework (CIMF).

NTIS

Computer Aided Manufacturing; Systems Analysis; Systems Integration; Object-Oriented Programming; Distributed Processing

19980012716 National Inst. of Standards and Technology, Gaithersburg, MD USA

Analysis of AP213 for Usage as a Process Plan Exchange Format

Iuliano, M., National Inst. of Standards and Technology, USA; Jones, A., National Inst. of Standards and Technology, USA; Feng, S., National Inst. of Standards and Technology, USA; Mar. 1997; 13p; In English
Report No.(s): PB98-103906; NISTIR-5992; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The objective of the Computer-Aided Manufacturing Engineering (CAME) project is to identify generic interfaces which can be used to demonstrate the integration of manufacturing engineering software applications. A number of software tool kits are envisioned to meet that objective. The first of these tool kits is called the Manufacturing Engineering Tool Kit (METK). It focuses on the integration of operations planning and Numerical Control (NC) program verification. The METK strategy is to use a process plan as a means of transferring the required electronic data between these applications. From the METK viewpoint, a process plan is a collection of work elements which describe the tasks to be done and the resources needed to do them. The exchange of these plans between these packages is the focus on this paper. The paper describes the commercial applications which make up the METK and our efforts to use the protocol specified in ISO DIS 10303-AP213 to exchange plans among these applications.

NTIS

Computer Aided Manufacturing; Software Development Tools; Software Engineering; Systems Integration; Computerized Simulation

19980013044 National Inst. of Standards and Technology, Gaithersburg, MD USA

Production Management Standards: Industrial Need

Jones, A., National Inst. of Standards and Technology, USA; McClean, C., National Inst. of Standards and Technology, USA; Sep. 1997; 28p; In English
Report No.(s): PB98-104102; NISTIR-6058; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The High Performance Computing and Communication (HPCC) program was formally established by the High Performance Computing Act of 1991 (Public Law 102-194). The goal of this program is to accelerate the development of future generations of high performance computers and networks and the use of these resources in the government and throughout the U.S. economy. NIST's Systems Integration of Manufacturing Applications (SIMA) Program is the agency's coordinating focus for its HPCC activities. The primary output of the SIMA Program will be a collection of specifications called Initial Manufacturing Exchange Specifications (IMES). IMESs provide the means to improve the SIMA Program's ability to meet the needs of the U.S. Industry in the area of standards and testing methods by providing a structured approach to the SIMA Program's activities in this arena. They will fill an important void in the manufacturing systems integration process as it exists today. Each IMES will be developed through an industry review and consensus process. It is expected that the manufacturing community will accept them as an authoritative specification. This document describes the results of Phase I of the Production component of the Production and Production Data Management project within SIMA. It identifies and documents the industry need, a manufacturing scenario, the interface specifications to be developed, potential collaborators, and the proposed technical approach for this project. It also describes the relationship between the proposed project and the SIMA Reference Architecture, other related projects, and existing standards activities.

NTIS

Computer Aided Manufacturing; Production Management; Data Management; Systems Integration; Computerized Simulation; Computers

19980013925 Department of the Navy, Washington, DC USA

Platform Independent Computer Interface Software Responsive to Scripted Commands

Simonoff, Adam J., Inventor, Department of the Navy, USA; Taft, Robert L., Inventor, Department of the Navy, USA; McIntock, Brian T., Inventor, Department of the Navy, USA; Fontenot, Larry A., Inventor, Department of the Navy, USA; Sep. 20, 1997; 114p; In English

Patent Info.: US-Patent-Appl-SN-941933

Report No.(s): AD-D018626; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

A Universal Client with a self-contained scripting language called GUIScript allows computing systems of varying architectures linked to the Internet or connected by an Intranet to run the same application software without modification or recompilation. Using a client-server architecture, the Universal Client receives GUIScript from the server, which commands the Universal Client to display certain graphical user interface (GUI) objects. The GUIScript also describes the behavior of the GUI objects presented by the Universal Client, thus providing a personality which defines the client application without changing the Universal Client's software. The Universal Client can also send GUIScript to the server to cause the server to execute commands. Preferably, a storage medium stores computer readable instructions for permitting a computer to display a graphical user interface (GUI) responsive to commands issued in the GUIScript scripting language to a Universal Client running on a JAVA(TM) virtual machine.

DTIC

Client Server Systems; Graphical User Interface

19980013931 Institute for Computer Applications in Science and Engineering, Hampton, VA USA

A Parallel Pipelined Renderer for the Time-Varying Volume Data Final Report

Chiueh, Tzi-Cker, Institute for Computer Applications in Science and Engineering, USA; Ma, Kwan-Liu, State Univ. of New York, USA; Dec. 1997; 18p; In English

Contract(s)/Grant(s): NAS1-19480; RTOP 505-90-52-01

Report No.(s): NASA/CR-1997-206275; NAS 1.26:206275; ICASE-97-70; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper presents a strategy for efficiently rendering time-varying volume data sets on a distributed-memory parallel computer. Time-varying volume data take large storage space and visualizing them requires reading large files continuously or periodically throughout the course of the visualization process. Instead of using all the processors to collectively render one volume at a time, a pipelined rendering process is formed by partitioning processors into groups to render multiple volumes concurrently. In this way, the overall rendering time may be greatly reduced because the pipelined rendering tasks are overlapped with the I/O required to load each volume into a group of processors; moreover, parallelization overhead may be reduced as a result of partitioning the processors. We modify an existing parallel volume renderer to exploit various levels of rendering parallelism and to study how the partitioning of processors may lead to optimal rendering performance. Two factors which are important to the overall execution time are re-source utilization efficiency and pipeline startup latency. The optimal partitioning configuration is the one that balances these two factors. Tests on Intel Paragon computers show that in general optimal partitionings do exist for a given rendering task and result in 40-50% saving in overall rendering time.

Author

Pipelining (Computers); Parallel Computers

19980013932 NERAC, Inc., Tolland, CT USA

Automatic Program Testing (Latest Citations from the INSPEC Database)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863279; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning methods and criteria used for automatic program testing in software development. Program structure analysis, verification, and error testing are discussed in reference to software performance and user specification. The citations also explore specific tests developed for industrial and communication applications. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Computer Programs; Error Detection Codes; Computer Programming

19980014094 National Inst. of Standards and Technology, Intelligent Systems Div., Gaithersburg, MD USA

NIST DMIS Interpreter

Kramer, T. R., Catholic Univ. of America, USA; Proctor, F. M., National Inst. of Standards and Technology, USA; Rippey, W.

G., National Inst. of Standards and Technology, USA; Scott, H., National Inst. of Standards and Technology, USA; Apr. 1997; 99p; In English

Contract(s)/Grant(s): NIST-70NANB2H1213

Report No.(s): PB97-167548; NISTIR-6012; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

The NIST DMIS interpreter is a software system which reads control code programs in the DMIS language (described in Section 1.2), produces calls to a set of canonical commands for coordinated measuring machines, digests the results of taking measurements, and produces a file describing measured features and tolerances. The canonical command calls made by the interpreter can be used to drive a coordinate measuring machine. This report describes the DMIS interpreter (in this report 'the interpreter').

NTIS

Computer Aided Manufacturing; Dimensional Measurement; Computer Programs

19980014096 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Object-Oriented Approach to State Restoration by Reversion in Fault Tolerant Systems

Tikhomirova, N. V., Saint Petersburg Technical Univ., Russia; Shturtz, I. V., Saint Petersburg Technical Univ., Russia; Romanovsky, A. B., Newcastle-upon-Tyne Univ., UK; Apr. 1997; 16p; In English

Report No.(s): PB97-176713; TRS-571; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The paper describes an approach to providing object state restoration in Fault Tolerant (FT) Object-Oriented (OO) computing systems by means of a reversion strategy. Two primitives are introduced that are used for creating a Reverse-Recoverable (RR) object: state saving primitive save and state restoring primitive restore. Reverse operations are processed in the order specified by a third primitive, undo. It is demonstrated how the approach suggested can be generalized to build a hierarchy of RR objects in the case of inheritance. The implementation of the approach is described for both the entire system and a separate object. The requirements for reverse operations are analyzed. Finally, preferable areas of reversion applicability are discussed.

NTIS

Object-Oriented Programming; Error Detection Codes; Restoration; Fault Tolerance

19980014098 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Design and Implementation of a Framework for Configurable Software

Wheater, S. M., Newcastle-upon-Tyne Univ., UK; Little, M. C., Newcastle-upon-Tyne Univ., UK; Apr. 1997; 17p; In English

Report No.(s): PB97-179790; TRS-578; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Software systems are typically composed of numerous components, each of which is responsible for a different function, e.g., one component may be responsible for remote communication, while another may provide a graphical user interface. Different implementation of a component may be possible, with each implementation tailored for a specific test of applications or environments. Configurable software systems are also important for a number of other reasons: additional components or modifications to those currently available, may be required. Software is often required to be configurable, enabling modifications to occur with minimal effect on existing users. to allow this configurability, components should only be available through interfaces that are clearly separated from their implementations, allowing users to be isolated from any implementation changes. This paper describes a model for constructing configurable software based upon this separation, and illustrates this with a software development system the authors have implemented which supports these ideas in C++.

NTIS

Configuration Management; Graphical User Interface; Computer Conferencing; Fault Tolerance; Software Engineering

19980014105 Cincinnati Univ., Dept. of Electrical and Computer Engineering and Computer Science, OH USA

High Speed, Numerically Superior Signal Processing Algorithms Using QRD and Delta Operator *Annual Report, 1 Oct. 1996 - 30 Sep. 1997*

Fan, Howard, Cincinnati Univ., USA; Oct. 20, 1997; 6p; In English

Contract(s)/Grant(s): N00014-96-I-0241

Report No.(s): AD-A331094; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Several research topics related to the delta-operator have been studied. Firstly, we are completing our research on the delta-operator based efficient stability tests by tying all loose ends and presenting the results in various coherent ways. Secondly, a delta-operator based least squares lattice algorithm has been developed. The new algorithm is computationally efficient, and has better numerical properties than the existing ones. Thirdly, more results have been obtained in the least squares method using the 'generalized delta operator'. In one of these new results, a computationally efficient algorithm using the delta operator has been devel-

oped to estimate continuous-time autoregressive process parameters from discrete-time data. Other topics such as blind equalization have also been studied and further results obtained.

DTIC

Autoregressive Processes; Least Squares Method; Signal Processing

19980014113 Carnegie-Mellon Univ., Software Engineering Inst., Pittsburgh, PA USA

Discovering DISCOVER Final Report

Tilley, Scott R., Carnegie-Mellon Univ., USA; Oct. 1997; 31p; In English

Contract(s)/Grant(s): F19628-95-C-0003

Report No.(s): AD-A331014; CMU/SEI-97-TR-012; ESC-TR-97-012; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report describes investigations into DISCOVER, a modern software development and maintenance environment. The study is guided by a framework for classifying program understanding tools that is based on a description of the canonical activities that are characteristic of the reverse engineering process. Implications of this work for advanced practitioners, researchers and tool developers, and the framework itself are discussed.

DTIC

Computer Programming; Software Engineering

19980014434 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Programming Atomic Actions in Ada 95

Romanovsky, A., Newcastle-upon-Tyne Univ., UK; Mitchell, S. E., Newcastle-upon-Tyne Univ., UK; Wellings, A. J., Newcastle-upon-Tyne Univ., UK; Apr. 1997; 17p; In English

Report No.(s): PB97-176689; TRS-586; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The paper describes the development of two kinds of atomic action schemes for Ada 95. The authors start by discussing the basic features required of an atomic action scheme and what choices, e.g. between synchronous and asynchronous actions, are appropriate for Ada 95. They then present two implementations of actions; first using Ada 95 packages to create asynchronous actions and secondly, as sets of tasks for synchronous actions. For each action type, the authors present code fragments illustrating their development and use. Finally, the authors discuss some related issues (exception resolution, action nesting, state restoration, software re-use, and extension, preventing information smuggling, distributed execution) which have been addressed in the work and show some of the problems encountered (the deserter problem, using different sorts of inter-participant communications and resources).

NTIS

Ada (Programming Language); Object-Oriented Programming; Distributed Processing

19980014435 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Contextual Net Unfolding and Asynchronous System Verification

Semenov, A., Newcastle-upon-Tyne Univ., UK; Yakovlev, A., Newcastle-upon-Tyne Univ., UK; Apr. 1997; 29p; In English

Contract(s)/Grant(s): EPSRC-GR/J52327; EPSRC-GR/K70175

Report No.(s): PB97-176705; TRS-572; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

A finite truncated unfolding of a Petri net is known to be a useful tool for verifying correctness of asynchronous systems. The paper proposes the use of contextual nets instead, by presenting an algorithm for constructing a finite contextual net unfolding segment. The method is applied to the verification of an asynchronous control structure implementing a four-slot synchronous communication mechanism, intended for use in real-time systems. The paper shows when the use of contextual net unfolding is most advantageous compared to the ordinary Petri net unfolding.

NTIS

Petri Nets; Synchronism; Algorithms; Control Systems Design; Computer Programs; Asynchronous Transfer Mode; Arithmetic and Logic Units

19980014460 State Univ. of New York, Dept. of Computer Science, Stony Brook, NY USA

Restricted Cycle Problems with Applications Progress Report

Skiena, Steven S., State Univ. of New York, USA; Oct. 14, 1997; 3p; In English

Report No.(s): AD-A332699; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

This progress report covers the first six months of funding on this grant. This grant covers two distinct lines of work: (1) research on the algorithmic complexity of path and cycle problems in graphs, and (2) implementations of graph algorithms as part

of large scale environments for combinatorial computing. As detailed below, substantial progress has been made in both areas since the commencement of funding.

DTIC

Computer Graphics; Combinatorial Analysis; Algorithms

19980014518 NERAC, Inc., Tolland, CT USA

C Compilers. (Latest citations from the INSPEC Database)

Jan. 1996; In English

Report No.(s): PB96-859251; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning developments, analysis, and applications of C compilers for microcomputers, minicomputers, and mainframes. Topics include compiler construction methods, speed of compilation, compiler portability and compactness, benchmark comparisons of various compilers, compiler compatibility and implementation, and compilers for UNIX systems. Compiler packages designed for developing computer programs are included.

NTIS

Bibliographies; Compilers; Computer Programs; Microcomputers

19980014520 NERAC, Inc., Tolland, CT USA

Color Image Processing (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863543; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning color image processing methods, apparatus, and systems. Citations describe image formation, generation, conversion, reproduction, storage, and recording. Topics include input and output images, color space of image information, color separation and extraction, color representation, image memory interface and synchronization, image scanners and printers, and digital color copying. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Image Processing; Color

19980014528 NERAC, Inc., Tolland, CT USA

Transputers and the OCCAM Programming Language. (Latest citations from the INSPEC Database)

Apr. 1996; In English; Page count unavailable.

Report No.(s): PB96-868112; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the Inmos transputer and the OCCAM programming language, also developed by Inmos. A transputer is a high performance 32-bit computer on a chip, complete with interfaces and memory. It has been designed as a building block component for use in parallel processing networks. The citations discuss the Inmos OCCAM language and its uses in a multiprocessor environment to direct data flow and processor communication. Topics include theory, practical applications, and case studies. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Transputers; Bibliographies; Programming Languages

19980014537 Carnegie-Mellon Univ., Dept. of Computer Science, Pittsburgh, PA USA

On-Line Algorithms in Machine Learning

Blum, Avrim L., Carnegie-Mellon Univ., USA; Jul. 1997; 21p; In English

Contract(s)/Grant(s): NSF CCR-93-57793

Report No.(s): AD-A330965; CMU-CS-97-163; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The areas of On-Line Algorithms and Machine Learning are both concerned with problems of making decisions about the present based only on knowledge of the past. Although these areas differ in terms of their emphasis and the problems typically studied, there are a collection of results in Computational Learning Theory that fit nicely into the 'on-line algorithms' framework. This survey article discusses some of the results, models, and open problems from Computational Learning Theory that seem particularly interesting from the point of view of on-line algorithms research. The emphasis in this article is on describing some of

the simpler, more intuitive results, whose proofs can be given in their entirety. Pointers to the literature are given for more sophisticated versions of these algorithms.

DTIC

Algorithms; Computation; On-Line Systems; Machine Learning

19980014797 Maryland Univ., Dept. of Computer Science, College Park, MD USA

Analyzing Safety Properties of Requirements Final Report

Atlee, Joanne, Maryland Univ., USA; Chechik, Marsha, Maryland Univ., USA; Gannon, John, Maryland Univ., USA; Jan. 1997; 34p; In English

Contract(s)/Grant(s): F49620-93-I-0034

Report No.(s): AD-A332306; AFOSR-TR-97-0611; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Precise notations have been developed to specify unambiguous requirements and ensure that all cases of appropriate system behavior are considered and documented. Using one such notation, we have developed techniques to automatically analyze software artifacts at early stages of the software development life cycle. We use model checking as our verification technique because it can be fully automated and can check properties of large systems. This report describes model checking and summarizes our efforts to use it to analyze software requirements and designs. We prove that requirements model system safety properties and that designs model consistency properties derived from requirements by creating abstractions of these software artifacts and using model checking to determine if the abstractions are models of the properties. We present results from a case study in which we analyzed the requirements and design of a small but realistic system.

DTIC

Computer Programming; Program Verification (Computers)

19980014803 NERAC, Inc., Tolland, CT USA

Programming Language Design (Latest Citations from the NTIS Bibliographic Database)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863162; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, development, and implementation of programming languages. Topics include language requirements and descriptions, editors and compilers, and specifications. Languages designed for specific applications and systems, as well as general purpose programs are considered. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Programming Languages

19980014808 Wizdom Systems, Inc., Naperville, IL USA

IDEF Model Repository, Version 1.3 Final Report

Feb. 1994; 32p; In English

Report No.(s): PB97-106272; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The NCMS IDEF Model Repository project was designed to create a software repository for IDEF0 process models, IDEF1X data models, and IDEF glossary. The prototype software demonstrates the benefits associated with the IDEF Repository concept including: time savings in the creation of new models provides by cut and paste capabilities; easier and faster sharing of models in large projects and among geographically dispersed project teams; model integration made quicker and easier; promoting the use of consistent terminology; an aid in building complex models from multiple sources of expertise, e.g., total enterprise models for CIM planning. The NCMS IDEF Repository project team designed a fully functional Repository, produced nonproprietary interface specifications for use by any tool vendor, created pilot software with partial functionality, tested the pilot software at field test sites, and revised the software and design as appropriate. The IDEF Model Repository project has developed functionally that no other prior system has provided coupled with state-of-the-art software technology in such a way as to assure a growth path for the future. This document summarizes the work performed and the results obtained. (Copyright (c) 1994 National Center for Manufacturing Sciences.)

NTIS

Computer Aided Manufacturing; Data Processing; Computer Programs; Data Base Management Systems; Software Engineering; Data Storage

19980014820 Royal Inst. of Tech., Stockholm, Sweden

Robust Reduction of Large Scale Linear Programming Problems

Ioslovich, I., Technion - Israel Inst. of Tech., Israel; Nov. 21, 1996; 25p; In English

Report No.(s): PB97-209050; TRITA/MAT-96-OS6; KTH/OPT SYST/FR-96/6 SE; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A set of new tests for the presolving analysis are described. The aim is to detect and remove redundant rows and columns in the large-scale linear programming (LP) problems. These tests are based on the solutions of some auxiliary LP problems with one constraint and upper limits on the variables, and the tests are applied iteratively to the primal and to the dual LP problem. The tests can be applied to a set of coefficients of LP problem in some range of uncertainty, providing a robust procedure for the scale reduction.

NTIS

Linear Programming; Robustness (Mathematics)

19980015106 Virginia Polytechnic Inst. and State Univ., Interdisciplinary Center for Applied Mathematics, Blacksburg, VA USA

Designing Optimal Actuation and Sensing Systems Final Report, 15 Aug. 1994 - 14 Aug. 1997

Cudney, Harley H., Virginia Polytechnic Inst. and State Univ., USA; Oct. 16, 1997; 20p; In English

Contract(s)/Grant(s): F49620-94-I-0346

Report No.(s): AD-A332309; AFOSR-TR-97-0651; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This AASERT grant supported three graduate students to work on the following topic: (1) developing design procedures for model reference adaptive control, (2) designing and building an adaptive vibration absorber, and (3) supporting the Air Force Phillips Laboratory by designing optimal active structural acoustic control for new composite rocket fairings. The following results were obtained. We developed a general method for designing an MRAC controller applied to a second order SISO plant. An adaptive self-tuning vibration absorber was designed, built, modeled, and tested. We created a modeling technique for the interior acoustic noise levels of rockets during launch, and tested a simply supported cylinder.

DTIC

Active Control; Mathematical Models; Model Reference Adaptive Control; Optimal Control

19980015119 National Inst. of Standards and Technology, Manufacturing Systems Integration Div., Gaithersburg, MD USA

Proceedings of the Process Specification Language (PSL) Roundtable

Schlenoff, C., National Inst. of Standards and Technology, USA; Knutilla, A., National Inst. of Standards and Technology, USA; Ray, S., National Inst. of Standards and Technology, USA; Oct. 1997; 24p; In English; Process Specification Language (PSL) Roundtable, Apr. 1997, Gaithersburg, MD, USA

Report No.(s): PB98-104151; NISTIR-6081; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

On April, 1997, the Process Specification Language (PSL) Project held a Roundtable discussion at the National Institute of Standards and Technology (NIST). The goal of the Roundtable was to assemble key champions and stakeholders of various representational approaches for process in order to discuss the relative merits to reach consensus on a language architecture and to establish a technical approach for proceeding. It was agreed that the language architecture should be based upon a formal semantic foundation, upon which would be layered a number of syntactic mappings, each with one or more presentations. In discussions about principal concepts of any process representation, it was agreed that 'process' and 'participant (resource)' are basic. A number of possible other concepts were suggested, but no consensus was reached. Additionally, five potential uses for the PSL were identified and discussed. They were: (1) provide a description of a process that has already occurred; (2) provide a 'recipe' (prescription) describing how a process can occur; (3) be used as a semantic model to nail down concepts and establish the scope of systems; (4) enable interoperability between manufacturing systems, enterprise systems, and/or AI systems; (5) enable technology transfer from AI to manufacturing (among other disciplines). Finally, three teams were formed to define: A set of scenarios to support the identification and definition of semantic concepts and to provide example usage of the language; A semantic description covering a small subset of the core language requirements; Three syntactic interpretations of that semantic description, mapping to object-oriented, KIF, and constraint-based presentations. A relational presentation was also deemed important, but no assignment was made.

NTIS

Computer Aided Manufacturing; Software Engineering; Computer Programming; Conferences; Object-Oriented Programming

19980015120 Royal Inst. of Tech., Dept. of Mathematics, Stockholm, Sweden

Primal-Dual Interior Methods for Nonconvex Nonlinear Programming: Optimization and Systems Theory

Forsgren, A., Royal Inst. of Tech., Sweden; Gill, P. E., California Univ., San Diego, USA; May 1996; 26p; In English

Report No.(s): PB97-209035; TRITA-MAT-96-0S4; KTH/OPT SYST/FR-96/4 SE; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper concerns large-scale general (nonconvex) nonlinear programming when first and second derivatives of the objective and constraint functions are available. A method is proposed that is based on finding an approximate solution of a sequence of unconstrained subproblems parameterized by a scalar parameter. The objective function of each unconstrained subproblem is an augmented penalty-barrier function that involves both primal and dual variables. Each subproblem is solved with a modified Newton method that generates search directions from a primal-dual system similar to that proposed for interior methods. An inertia-controlling symmetric indefinite factorization is used to provide descent directions and directions of negative curvature for the augmented penalty-barrier merit function.

NTIS

Nonlinear Programming; Penalty Function; Newton Methods; Theorems; Derivation

19980015123 Carnegie-Mellon Univ., Dept. of Computer Science, Pittsburgh, PA USA

System Language and Support for Secure Mobile Computing Final Report, 1993-1997

Taylor, C. Roy, Carnegie-Mellon Univ., USA; Sep. 09, 1997; 37p; In English

Contract(s)/Grant(s): ARPA Order-A700

Report No.(s): AD-A331380; CMU-CS-97-168; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Research under the 'Secure Mobile Computing' project has developed middleware and system-level solutions that provide access to shared data and that apply computing resources to such data in a manner that preserves system scalability and security. The work has also established connections with potential users of secure, mobile computing technology and produced portable software systems that will support its further development. This report summarizes work during the 1993-97 contract period and guides the reader into the literature.

DTIC

Programming Languages; Data Management; Data Bases; Computer Information Security

19980015127 Pennsylvania Univ., Medical Image Processing Group, Philadelphia, PA USA

Programs for Evaluation of 3D PET Reconstruction Algorithms

Furule, S. S., Sao Paulo Univ., Brazil; Matej, S., Pennsylvania Univ., USA; Herman, G. T., Pennsylvania Univ., USA; Nayaran, T. K., Pennsylvania Univ., USA; Klnahan, R. M., Pennsylvania Univ., USA; Feb. 1994; 61p; In English

Contract(s)/Grant(s): FAPESP-92/0310-1; NIH-HL-28438; DE-FG02-88ER-06064

Report No.(s): AD-A331311; MIPG-206; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Evaluation of a reconstruction algorithm should be done using a sample set that is large enough to provide us with a statistically significant result. In order to carry out an evaluation, one possibility is to use a set of computer simulated phantoms, that takes into account some parameter variabilities. This technical report describes in detail programs that generate a set of 3D phantoms and projection data, reconstruct, evaluate and then compare. The main characteristics are: (1) Phantom and projection data generation, (a) Phantoms with many (69) ellipsoid features, ranging from small (4 mm) to large (40 mm) sized features; (b) Phantoms are random samples from a statistically described ensemble of 3D images resembling those to which PET would be applied in a medical situation (features with random size, orientation and activity); (c) Features are inside spheres that provide background value for some important clinical tasks such as detectability; (d) Types of features: hot, cold and normal spots, and (e) Emulation of 3D PET scanner for projection data generation, with detector field of view (FOV) blurring and a realistic 3D PET noise model. (2) Reconstruction algorithms: (a) Algebraic Reconstruction Technique using blob (ARTblob) as basis function; (b) ART using voxels (ARTvox); (c) EM-ML using blobs (EMblob), and (d) EM-ML using voxels (EMvox). (3) Evaluation for following tasks: (a) Training figure of merit (FOM); (b) Structural accuracy; (c) Hot spot detectability, and (d) Cold spot detectability. (4) Statistical comparison using paired t-test. Justifications for using some models are described in the paper and an application evaluating some reconstruction methods is reported.

DTIC

Software Engineering; Computer Programs; Computerized Simulation; Random Sampling; Computer Aided Tomography

19980015134 National Center for Mfg. Sciences, Ann Arbor, MI USA

Competing in World-Class Manufacturing: America's 21st Century Challenge

1991; 32p; In English

Report No.(s): PB98-104300; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This executive summary describes NCMS' book of the same title, that defines world-class manufacturing and develops a vision of the manufacturing agenda required to make America's manufacturers successful in competing on a global basis into the

twenty-first century. World class manufacturers operate within a common framework and develop quality and customer service. Various structural, infrastructural, and integration strategy choices for manufacturing are described in detail.

NTIS

Computer Aided Manufacturing; Quality Control; Management Planning

19980015156 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA

Parameter Estimation for Real Filtered Sinusoids

Zahirniak, Daniel R., Air Force Inst. of Tech., USA; Sep. 1997; 192p; In English

Report No.(s): AD-A331303; AFIT/DS/ENG/97-05; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This research develops theoretical methods for parameter estimation of filtered, pulsed sinusoids in noise and demonstrates their effectiveness for Electronic Warfare (EW) applications. Within the context of stochastic modeling, a new linear model, parameterized by a set of Linear Prediction (LP) coefficients, is derived for estimating the frequencies of filtered sinusoids. This model is an improvement over previous modeling techniques since the effects of the filter and the coefficients upon the noise statistics are properly accounted for during model development. From this linear model, a relationship between LP coefficient estimation and Maximum Likelihood (ML) frequency estimation is derived and several coefficient estimators, based on fixed point theory and ML techniques, are constructed. A bound for the coefficient estimation error is developed and used to gauge the quality of point estimates directly from the data and knowledge of the noise variance. Furthermore, a multirate implementation of an EW digital channelized receiver is described functionally and probabilistically. When applied to the EW receiver, simulations indicate the new estimators provide unbiased, minimum variance, parameter estimates of filtered sinusoids at lower SNRs than the estimators currently employed. The bounds on the estimation error are then used establish confidence intervals for each point estimate.

DTIC

Channel Flow; Linear Prediction; Maximum Likelihood Estimates; Measuring Instruments; Sine Waves; Statistical Analysis; Stochastic Processes

19980015161 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Atomic Actions Based on Distributed/Concurrent Exception Resolution

Romanovsky, A., Newcastle-upon-Tyne Univ., UK; Nov. 1996; 22p; In English

Report No.(s): PB97-140933; TRS-560; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The state of art in concurrent exception handling and resolution is discussed and a brief outline of all research in this area given. Our intention is to demonstrate that exception resolution is a very useful concept which should be used to facilitate joint forward error recovery in concurrent and distributed systems. To do this, several new arguments are considered. We regard resolution as reaching an agreement among cooperating participants of an atomic action. It is provided by the underlying system, which makes it unified and less error prone, and this is important for forward error recovery, complex of nature. We classify atomic action schemes into asynchronous and synchronous ones, and resolution implementations into centralized and decentralized ones. Another issue that we believe to be very important is about introducing atomic action schemes based on exception resolution into existing concurrent and distributed languages, which usually have only local (one-process) exceptions. We outline the basic approach and demonstrate its applicability by showing how resolution can be used in Ada83, Ada95 (for both concurrent and distributed systems) and Java. A discussion of ways to make this concept more object oriented and, with the help of reflection, more flexible and useful, conclude the paper.

NTIS

Software Engineering; Software Development Tools

19980015185 Central Lab. of the Research Councils, Daresbury Lab., Warrington, UK

Theory and Computational Science, Annual Report 1994-1995 Annual Report, 1994 - 1995

Harrison, N. M., Central Lab. of the Research Councils, UK; 1996; 215p; In English

Report No.(s): PB96-175104; Copyright Waived; Avail: CASI; A10, Hardcopy; A03, Microfiche

Computational science is a relatively new discipline which has blossomed over the last 15 years or so with the widening availability of high performance (super) computing facilities and which now underpins a huge amount of science and engineering. Theory and Computational Science at Daresbury (TCS) aims to provide, in a fully cost-effective and efficient manner, world class expertise and support for UK theoretical and computational science and engineering, both in Academia and Industry. The accompanying reports give much more information on projects currently in progress, the scientific software we develop and distribute and the services we provide.

NTIS

Computerized Simulation; Computation; Computer Programming

19980015224 NERAC, Inc., Tolland, CT USA

Software Development Tools. (Latest Citations from the Microcomputer Abstracts Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864533; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the use of software development tools. Tools such as compilers, assemblers, debuggers and emulators are included. The capabilities of each tool are discussed in relation to specific mainframe and personal computer platforms, and software languages such as C/C++ and Ada. Computer-Aided Software Engineering (CASE) is excluded.

NTIS

Bibliographies; Computer Programs; Microcomputers; Compilers

19980015342 National Inst. of Standards and Technology, Manufacturing Systems Integration Div., Gaithersburg, MD USA

Reference Manual for the Algorithm Testing System Version 2.0

Rosenfeld, D. A., National Inst. of Standards and Technology, USA; Oct. 1995; 44p; In English

Report No.(s): PB96-128244; NISTIR-5722; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The Algorithm Testing System (ATS) is a software system which supports the Algorithm Testing and Evaluation Program for Coordinate Measuring Systems (ATEP-CMS). ATEP-CMS is a NIST Special Test Service for evaluating the performance of CMS geometric fitting software. The ATS typically performs an analysis by generating data sets, applying its own fitting routines to fit geometrics onto the data sets, and comparing its own fit results to the fit results of the software under test for the same data. This report is a reference manual for the ATS. It documents fully the usage of the ATS, describes in detail the data generation and analysis capabilities of the ATS, and defines the naming conventions used by the ATS.

NTIS

User Manuals (Computer Programs); Computer Program Integrity; Metrology; Algorithms

19980015363 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

FAST: A Framework for Automating Statistics-Based Testing

Chu, H. D., Newcastle-upon-Tyne Univ., UK; Dobson, J. E., Newcastle-upon-Tyne Univ., UK; Jan. 1997; 33p; In English

Report No.(s): PB97-140982; TRS-564; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

To achieve software quality, testing is an essential component in all software development. It involves the execution of a deterministic software system with test data and comparison of the results with the expected output, which must satisfy the user's requirements. This accounts for over 25% of the cost of a software development. Therefore, automation has considerable potential. The quality programming which was introduced by Cho can automatically generate data for testing, based on a so-called 'SIAD tree' which is used to represent the hierarchical and 'network' relation between input elements and also incorporates rules into the tree for using the inputs. However, it lacks a clear framework which would show how automated testing can be achieved. To address this problem, we present a Framework for Automating Statistics-Based Testing (FAST), which is an extension of the testing concept in quality programming to achieve automated testing. In FAST, we propose a SOAD tree which similar to the structure of the SIAD tree to describe the syntactic structure of the product unit and its defectiveness. Based on this tool, the inspection of test results can be automatically achieved by lexical and syntax analysis. The implementation of automated software testing for Command File Interpreter (CFI) software which incorporates the framework is also describe.

NTIS

Computer Programming; Program Verification (Computers); Software Engineering

19980015364 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Implementing Synchronous Co-ordinated Atomic Actions Based on Forward Error Recovery

Romanovsky, A., Newcastle-upon-Tyne Univ., UK; Randell, B., Newcastle-upon-Tyne Univ., UK; Stroud, R. J., Newcastle-upon-Tyne Univ., UK; Xu, J., Newcastle-upon-Tyne Univ., UK; Zorzo, A., Newcastle-upon-Tyne Univ., UK; Jan. 1997; 20p; In English
Report No.(s): PB97-140925; TRS-561; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Co-ordinated atomic action concept is proposed as a means for providing fault tolerance in complex object oriented systems which incorporate both co-operative and competitive concurrency. This paper has two purposes: to discuss a particular implementation of this concept and to address many implementation issues which are common for any experiments with this concept. Our implementation relies on a thoroughly designed set of programming conventions for the standard Ada (Ada95) language and uses forward error recovery which incorporates asynchronous exception handling and concurrent exception resolution. We utilize

the peculiarities of Ada as much as possible, which makes our approach practical and useful for many critical applications with high dependability requirements. This scheme offers a basic framework for using co-ordinated atomic actions and allows us to continue experimenting with them.

NTIS

Ada (Programming Language); Experimentation; Fault Tolerance; Synchronism

19980015366 Consiglio Nazionale delle Ricerche, Ist. di Analisi dei Sistemi ed Informatica, Rome, Italy

Lambda and ESI-Calculus for Enhanced Strict Inheritance

DiBlasio, P., Consiglio Nazionale delle Ricerche, Italy; Temperini, M., Consiglio Nazionale delle Ricerche, Italy; 1995; 19p; In English

Report No.(s): PB96-153309; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The authors present a specialization inheritance mechanism for a strongly typed object-oriented language, called Enhanced Strict Inheritance (ESI). It is a mechanism of classification in which the subclassing relation between classes reflects the subtyping relationship between the corresponding types. The definition of ESI is based on a covariant redefinition rule on methods. ESI is modeled on the lambda & ESI-calculus, a modification of the lambda & calculus of overloaded functions (CGL93). In ESI hierarchies the only constraint is covariance of attribute redefinition; so any other restriction in redefinition rule and compatibility of result types in confusable methods is relaxed. ESI approach is based on a peculiar notion of point of view for multiple inheritance, called abstraction level.

NTIS

Calculus; Computer Techniques; Mathematical Programming; Object-Oriented Programming; Software Development Tools

19980015376 Massachusetts Inst. of Tech., Lab. for Information Decision Systems, Cambridge, MA USA

A Unified, Multiresolution Framework for Automatic Target Detection and Recognition Final Report, 30 Sep. 1993 - 31 Jul. 1997

Grimson, W. E. L., Massachusetts Inst. of Tech., USA; Shapiro, J. H., Massachusetts Inst. of Tech., USA; Willsky, A. S., Massachusetts Inst. of Tech., USA; Aug. 01, 1997; 18p; In English

Contract(s)/Grant(s): F49620-93-I-0604

Report No.(s): AD-A332303; AFOSR-TR-97-0621; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The basic objective of this research program is to pursue an integrated set of research problems associated with Automatic Target Detection and Recognition (ATD/R). Our research is unified in the sense that it involves the investigation of problems spanning the complete processing chain from sensor signal processing to image analysis to object recognition, thereby allowing us to understand how these individual processing stages interact and influence each other and to define new approaches that cut across established decompositions of the ATD/R problem. A second unifying theme of our work is the development of multiresolution methods. These range from the use of statistically optimal multiresolution algorithms that provide both extremely efficient procedures for image analysis and an explicit and rational basis for addressing noise/resolution tradeoffs to methods for multiresolution characterizations of object geometry and corresponding algorithms for extraction of multiresolution geometric features and for object recognition.

DTIC

Target Recognition; Pattern Recognition

19980015384 Allen-Bradley Co., Torrance, CA USA

Adaptive Process Control of Compression Molded Composites Final Report

May 1995; 106p; In English; Original contains color illustrations

Report No.(s): PB98-104334; Copyright Waived; Avail: CASI; A06, Hardcopy; A02, Microfiche

Much work has been accomplished in the area of in-process monitoring and/or real-time control of polymer matrix composites (PMC) processing, from sensor development to artificial intelligence. However, little success has been experienced in integrating this type of technology into a robust cost effective system. Through a cooperative effort between Allen-Bradley, Erie Press Systems, the National Center for Manufacturing Sciences and United Technologies, Pratt and Whitney, an adaptive process control system for compression molded composites is presented. The quality manufacture of Pratt and Whitney's PMC Fan Exit Guide Vanes (FEGVs) depend on the chemical state of the raw material and the proper application of heat and pressure during the cure cycle process.

NTIS

Adaptive Control; Polymer Matrix Composites; Process Control (Industry); Systems Integration

19980015388 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Extended Interval Temporal Logic and A Framing Technique for Temporal Logic Programming

Duan, Z. H., Newcastle-upon-Tyne Univ., UK; Sep. 1996; 178p; In English

Report No.(s): PB97-140990; TRS-556; Copyright Waived; Avail: CASI; A09, Hardcopy; A02, Microfiche

Temporal logic programming is a paradigm for specification and verification of concurrent programs in which a program can be written, and the properties of the program can be described and verified in a same notation. However, there are many aspects of programming in temporal logics that are not well understood. One such aspect is concurrent programming, another is framing and the third is synchronous communication for parallel processes. This thesis extends the original Interval Temporal Logic (ITL) to include infinite models, past operators, and a new projection operator for dealing with concurrent computation, synchronous communication, and framing in the context of temporal logic programming.

NTIS

Logic Programming; Frames (Data Processing)

19980015405 Carnegie-Mellon Univ., Dept. of Computer Science, Pittsburgh, PA USA

Towards a Formal Treatment of Implicit Invocation

Dingel, J., Carnegie-Mellon Univ., USA; Garlan, D., Carnegie-Mellon Univ., USA; Jha, S., Carnegie-Mellon Univ., USA; Notkin, D., Carnegie-Mellon Univ., USA; Jul. 29, 1997; 24p; In English

Contract(s)/Grant(s): F30602-96-1-0299; NSF CCR-96-33532

Report No.(s): AD-A329940; CMU-CS-97-153; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Implicit invocation SN92,GN91 has become an important architectural style for large-scale system design and evolution. This paper addresses the lack of specification and verification formalisms for such systems. A formal computational model for implicit invocation is presented. We develop a verification framework for implicit invocation that is based on Jones' rely/guarantee reasoning for concurrent systems Jon83,St(phi)91. The application of the framework is illustrated with several examples. The merits and limitations of the rely/guarantee paradigm in the context of implicit invocation systems are also discussed.

DTIC

Systems Engineering; Data Processing

19980015436 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Correctness of Dataflow and Systolic Algorithms: Case Studies in Higher-Order Algebra

Meinke, K., Newcastle-upon-Tyne Univ., UK; Steggles, L. J., Newcastle-upon-Tyne Univ., UK; Nov. 1996; 47p; In English

Report No.(s): PB97-140941; TRS-559; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

We present two case studies which illustrate the use of higher-order algebra a formalism for specification and verification of hardware algorithms. In the first case study we specify a systolic algorithm for convolution and formally verify its correctness using higher-order equational logic. The second case study demonstrates the expressive power of higher-order algebraic specifications by presenting a non-constructive specification of the Hamming stream problem. A dataflow algorithm for computing the Hamming stream is then specified and the correctness of this algorithm is verified by semantical methods. Both case studies illustrate aspects of the metatheory of higher-order equational logic.

NTIS

Computerized Simulation; Computer Programming; Formalism; Polymorphism; Algebra

19980015624 NERAC, Inc., Tolland, CT USA

Expert Systems. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863717; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning the design, development, implementation, and operation of expert systems. Citations describe the types of expert systems, including knowledge-based, rule-based, fuzzy, inferencing, and object-oriented. Applications in plant system design and management, communication networks, tool life prediction and wear diagnosis, experimental design, flight training, and contaminants analysis are covered. User-friendly and online surveillance expert systems are presented.(Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Expert Systems

19980015641 University of Southern California, Dept. of Civil Engineering, Los Angeles, CA USA

A Micromechanical Investigation of Instability in Particulate Media *Final Report, 1 Apr. 1993 - 31 Mar. 1997*

Bardet, J. P., University of Southern California, USA; Sep. 1996; 7p; In English

Contract(s)/Grant(s): F49620-93-I-0295

Report No.(s): AD-A329712; AFOSR-TR-97-0445; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The main research objective is to investigate the microscopic origins of shear band instability in particulate media. Our methodology combines computational micromechanics, laboratory experiments, and continuum mechanics. The particular research objective are (1) to improve the existing methods of computational micromechanics, (2) to examine the formation of shear bands, (3) to investigate the effects of grain rotation on shear strength and shear bands, (4) to study liquefaction instability, and (5) to explore the micro-macro mechanics transition relevant to material instability. Stereophotogrammetry was found to yield an accurate measurement of the motion of a large number of particles of idealized granular media. The stereo-technique was capable of determining not only the displacement and rotation of particles, but also their relative penetration. This optical technique was found to be more accurate than the present computer vision methods being processed, are to be used to re-examine the findings about the effects of higher-order continua on the response of granular media, and are therefore instrumental to understand the instability phenomena in granular media.

DTIC

Continuum Mechanics; Micromechanics; Particulates; Shear Strength

19980015653 Carnegie-Mellon Univ., Dept. of Computer Science, Pittsburgh, PA USA

The Fox Project: Advanced Development of Systems Software *Topical Report, Jul. - Sep. 1997*

Sep. 1997; 5p; In English

Contract(s)/Grant(s): ARPA Order 8313

Report No.(s): AD-A330545; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The long-term objectives of the Carnegie Mellon Fox Project are to improve the design and construction of systems software and to further the development of advanced programming language technology. We use principles and techniques from the mathematical foundations of programming languages, including semantics, type theory, and logic, to design and implement systems software, including operating systems, network protocols, and distributed systems. Much of the implementation work is conducted in the Standard ML (SML) language, a modern functional programming language that provides polymorphism, first-class functions, exception handling, garbage collection, a parameterized module system, static typing, and a formal semantics. This Project involves several faculty members and spans a wide range of research areas, from (1) experimental development of systems software to (2) advanced compiler development to (3) language design.

DTIC

Computer Programming; Computer Systems Programs; Language Programming; Mathematical Programming; Programming Languages; Protocol (Computers); Polymorphism

19980015738 NERAC, Inc., Tolland, CT USA

Object Linking and Embedding (OLE). (Latest Citations from the Microcomputer Abstracts Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-863527; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the theory and application of object linking and embedding (OLE) protocol. Comparisons of OLE to OpenDoc and open database connectivity (ODBC) technologies are made. The use of OLE technology in cross-platform, enterprisewide, and network applications is discussed. Application program interfaces (API) are also covered. Products which incorporate OLE technology are reviewed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Computer Systems Programs

19980015748 Catholic Univ. of America, Dept. of Mechanical Engineering, Washington, DC USA

NIST RS274KT Interpreter

Kramer, T. R., Catholic Univ. of America, USA; Proctor, F., Catholic Univ. of America, USA; Oct. 26, 1995; 58p; In English

Report No.(s): PB96-147954; NISTIR-5738; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The NIST 'RS274KT interpreter' is a software system which reads numerical control code in the 'KT' dialect of the RS274 numerical control language and produces calls to a set of canonical machining functions. The output of the interpreter can be used to drive a Kearney and Trecker 800 4-axis machining center. The report describes the RS274KT interpreter.

NTIS

Computer Aided Manufacturing; Numerical Control; Computer Systems Programs; Recognition; Translating

19980015804 Alabama Univ., Dept. of Physics, Huntsville, AL USA

Polarization Diversity Active Imaging: Mueller Matrix Imaging Polarimetry of Spheres and Cones *Final Report, 15 Jul. 1996 - 14 Jul. 1997*

Chipman, Russell A., Alabama Univ., USA; Gerligand, Pierre Y., Alabama Univ., USA; Sornsin, Elizabeth, Alabama Univ., USA; Smith, Matthew, Alabama Univ., USA; Mar. 21, 1997; 90p; In English

Contract(s)/Grant(s): F49620-96-I-0316; AF Proj. 2301

Report No.(s): AD-A329709; AFOSR-TR-97-0321; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Polarization Diversity Active Imaging illuminates a scene or target with a sequence of polarization states and then measures images of the polarization state scattered from a scene or target. These polarization images are then analyzed to provide additional details in the optical signature of objects by quantifying the object interaction with polarized light. The Mueller Matrix Imaging Polarimeter at The University of Alabama in Huntsville has been configured for bistatic scattering measurements of the Mueller matrices of small targets. The initial targets used were simple geometric shapes (spheres and cones). These targets were chosen because mathematical descriptions of their surfaces are easily obtained. Therefore, the measured polarization signatures can be compared with the known surface orientations. Data obtained indicated the ability of the PDAI technique to measure polarimetric signatures of the spheres and cones made of different materials (metals, plastics, and wood). In that data, there were evident relationships between various polarization properties and an object's material and shape. The results demonstrated the feasibility and the strong potential of the PDAI technique to determine the shape and orientation of an object from its polarization properties.

DTIC

Imaging Techniques; Mathematical Models; Polarimeters; Polarimetry; Polarized Light; Scattering

19980015923 National Inst. of Standards and Technology, Manufacturing Systems Integration Div., Gaithersburg, MD USA

Product Realization Process Modeling: A Study of Requirements, Methods and Research Issues

Lyons, K. W., National Inst. of Standards and Technology, USA; Duffey, M. R., National Inst. of Standards and Technology, USA; Anderson, R. C., National Inst. of Standards and Technology, USA; Jun. 1995; 48p; In English

Report No.(s): PB96-147962; NISTIR-5745; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The purpose of the document is to identify and document key requirements, industry practices, and research questions which should drive new methods and computer tools for process modeling of product realization. It addresses a wide range of industry-relevant modeling issues to help focus discussion on future research directions and its intended audience are modeling researchers and practitioners in industry, universities, and other federal agencies. Although process modeling methods have been applied to many types of development efforts (e.g., software engineering, VL-SI), our sole focus in the report is realization of discrete electro-mechanical products.

NTIS

Computer Aided Manufacturing; Product Development; Requirements; Models; Computer Techniques; Computer Programming

19980016124 Naval Command, Control and Ocean Surveillance Center, RDT and E Div., San Diego, CA USA

Terrain Parabolic Equation Model (TPEM) Computer Software Configuration Item (CSCI) Documents *Final Report*

Barrios, A. E., Naval Command, Control and Ocean Surveillance Center, USA; May 1997; 291p; In English

Report No.(s): AD-A327522; NRAD-TD-2963; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

This document specifies the functional requirements that are to be met by the Terrain Parabolic Equation Model (TPEM) Computer Software Configuration Item (CSCI). A discussion of the input software requirements is presented together with a general description of the internal structure of the TPEM CSCI as it relates to the CSCI's capability.

DTIC

Software Engineering; Electromagnetic Properties; Computer Programming

19980016154 NERAC, Inc., Tolland, CT USA

Discrete Event Computer Simulation. (Latest Citations from the INSPEC Database)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863816; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning principles, developments, evaluation, and applications of discrete event simulation (DES) technology. Topics include dynamic analyses of discrete event systems, DES language development and evaluation, simulation modelling and analysis, digital simulation, parallel processors in DES, production scheduling, manufacturing process simulation, business support systems, and data communication systems. Artificial intelligence techniques and expert systems in the development of DES systems are considered. Citations concerning simulation languages are examined in a separate bibliography. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Computerized Simulation; Systems Simulation

19980016307 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Practical Exception Handling and Resolution in Concurrent Programs

Romanovsky, A., Newcastle-upon-Tyne Univ., UK; Mar. 1996; 23p; In English

Report No.(s): PB96-179627; TRS-545; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The paper discusses how atomic actions based on forward error recovery in the form of concurrent exception handling and resolution can be programmed within standard conventional languages (Ada and Ada95). We express the main characteristics of the general atomic action scheme in terms of these languages and discuss a set of templates (skeletons) and programmers' conventions which would allow to program atomic actions within Ada and Ada95. We offer an approach to implementing a resolution procedure (function) and outline other approaches. We introduce a general concept of self-checking programming, which allows to have the kind of failure assumption necessary for simplifying the atomic action support, and discuss how it can be applied (to Ada, in particular). It is shown how this approach helps to solve the deserter process problem. We outline the main improvements which can be made in the scheme when Ada95 is used.

NTIS

Fault Tolerance; Concurrent Processing; Error Correcting Codes

19980016369 University of Southern California, Information Sciences Inst., Marina del Rey, CA USA

Learning Effective and Robust Knowledge for Semantic Query Optimization *Topical Report*

Hsu, Chun-Nan, University of Southern California, USA; Dec. 1996; 151p; In English

Contract(s)/Grant(s): F30602-94-C-0210; NSF/IRI-9313993

Report No.(s): AD-A327515; ISI/RR-96-451; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Optimizing queries to heterogeneous, distributed multidatabases is an important problem. Due to the query complexity and the heterogeneity of databases, it is difficult for conventional optimization approaches to solve the problem satisfactorily. Semantic Query Optimization (SQO) can complement conventional approaches to overcome the heterogeneity and considerably reduce redundant data transmission. SQO optimizers use rules about data regularities to yield significant cost reduction. However, hand coding useful rules for SQO is impracticable. This dissertation presents a machine learning approach to this knowledge bottleneck problem. Unlike search control rules or classification rules studied extensively in machine learning, two roughly correlated measures must be maximized in the learning of high utility rules for SQO. The first measure is the effectiveness. Effective rules must be applicable in many different queries and yield high cost reduction. The second measure is the robustness against database changes. That is, they must remain valid regardless of database changes. This dissertation presents a new inductive learning approach to learning effective and robust rules. The learning approach considers both applicability and cost-reduction in rule induction to learn effective rules. The learned rules are robust because the learner is able to guide the learning for robust rules with an approach to estimating the probabilities of database changes. To evaluate the utility of the learning approach, this dissertation also describes an extended SQO approach for query plans that retrieve data from heterogeneous multidatabases. The experimental results show that the learned rules produce significant savings while being robust against database changes.

DTIC

Machine Learning; Knowledge Based Systems; Data Reduction; Data Transmission

19980016584 Smiths Industries Aerospace and Defence Systems Ltd., Cheltenham, UK

Mission Software - The Next 25 Years

Mayoh, Howard, Smiths Industries Aerospace and Defence Systems Ltd., UK; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 6p; In English; Also announced as 19980016571; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

The growth in computing technology over the last 25 years has been truly dramatic. The techniques used to develop the software have also seen significant changes. The growth in avionics software has been no less dramatic. This paper considers the changes that have occurred, and that will continue to take place in the future, in terms of three generations of avionic computing. The First Generation covers the early application of computing to mission system applications. These mission applications were distributed over few computing centres, with very little communication between them. The Second Generation of avionics computing is characterized by a major growth in the size and complexity of the software applications. The changes we can expect over the next generation, the Third Generation, of avionic computing will be as great as those between the first and the second. The most significant change will probably be in the avionic computing architecture, in that Integrated Modular Avionics (IMA) will be at the core of the avionic computing infrastructure. The need to reduce pilot workload and increase systems performance will demand an increase in the scale and complexity of mission management applications. To achieve the growth that will be required to support these new applications a significant increase in productivity will be required. The need to develop highly integrated applications across organizational boundaries will mean an increasing emphasis on integrated teams. A combination of IMA architecture, with the growth in size and complexity of the mission systems applications, will introduce a number of software management challenges.

Author

Avionics; Computer Programs; Aircraft Instruments; Systems Engineering; Electronic Modules; Architecture (Computers)

19980016631 Vrije Univ., Faculteit der Wiskunde en Informatica, Amsterdam, Netherlands

Algebraic Perspective of Constraint Logic Programming

Deboer, F. S., Vrije Univ., Netherlands; Dipierro, A., Vrije Univ., Netherlands; Palamidessi, C., Vrije Univ., Netherlands; Sep. 1994; 30p; In English

Report No.(s): PB96-159959; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We develop a denotational, fully abstract semantics for constraint logic programming (clp) with respect to successful and failed observables. The denotational approach turns out very useful for the definition of new operators on the language as the counterpart of some abstract operations on the denotational domain. In particular, by defining our domain as a cylindric Heyting algebra, we can exploit, to this aim, operations of both cylindric algebras (such as cylindrification), and Heyting algebras (such as implication and negation). The former allows us to generalize the clp language by introducing an explicit hiding operator; the latter allows us to define a notion of negation which extends the classical negation used in Logic Programming. In particular, we show that our notion subsumes both Negation as Failure and Negation as Instantiation.

NTIS

Logic Programming; Computer Programming; Semantics; Algebra

19980016673 NERAC, Inc., Tolland, CT USA

Reusable Computer Software. (Latest Citations from the NTIS Bibliographic Database)

Nov. 1995; In English; Page count unavailable.

Report No.(s): PB96-855283; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning a software development technology which stores common reusable software modules in a software library. The citations explore implementation, guidelines, handbooks, and standards for design architectures, software metrics, automated support, and configuration management. Software libraries, rapid prototyping, and ADA applications are also detailed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Computer Programs; Software Reuse

19980016691 Institute of Electrical and Electronics Engineers, Washington, DC USA

Sixth Workshop on Heterogeneous Computing: Proceedings (HCW 1997)

Hensgen, Debra, Editor, Naval Postgraduate School, USA; Sep. 30, 1997; 240p; In English; 6th; Workshop on Heterogeneous Computing (HCW 1997), 1 Apr. 1997, Geneva, Switzerland

Report No.(s): AD-A329749; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

This is the 6th Heterogeneous Computing Workshop, also known as HCW '97. Heterogeneous computing is a very important research area with great practical impact. The topic of heterogeneous computing covers many types of systems. A heterogeneous system may be a set of machines interconnected by a wide-area network and used to support the execution of jobs submitted by a variety of users. A heterogeneous system may be a suite of high-performance machines tightly interconnected by a fast dedicated local-area network and used to process a set of production tasks, where the subtasks of each task may execute on different machines

in the suite. A heterogeneous system may also be a special-purpose embedded system, such as a set of different types of processors used for automatic target recognition. In the extreme, a heterogeneous system may consist of a single machine that can reconfigure itself to operate in different ways (e.g., in different modes of parallelism). All of these types of heterogeneous systems (as well as others) are appropriate topics for this workshop series. I hope you find the contents of these proceedings informative and interesting, and encourage you to look also at the proceedings of past and future HCWs.

DTIC

Conferences; Computer Programs; Mathematical Models; Software Engineering; Computation; Heterogeneity

19980016727 Brown and Sharpe Mfg. Co., North Kingstown, RI USA

Programmed Inspection Machines

Lee, Robert, Brown and Sharpe Mfg. Co., USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 793-817; In English; Also announced as 19980016712; Original contains color illustrations; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

The paper presents a discussion on programmed inspection machines for the gas turbine industry. Components are getting tolerance wise tighter and tighter all the time and manufacturers tolerances are going down below the thousandth of an inch range and getting in the five tenths range very rapidly. The paper gives a summary of different types of probing systems and the need for optimizing their performance.

CASI

Gas Turbines; Inspection; Measuring Instruments; Scanning; Computerized Simulation

19980016760 Newcastle Univ., Dept. of Computing Science, Newcastle, UK

System for Fault-Tolerant Execution of Data and Compute Intensive Programs over a Network of Workstations, series

Smith, J. A., Newcastle Univ., UK; Shrivastava, S. K., Newcastle Univ., UK; Sep. 1996; 19p; In English
Report No.(s): PB97-140859; TRS-553; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

A well known structuring technique for a wide class of parallel applications is the bag of tasks, which allows a computation to be partitioned dynamically between a collection of concurrent processes. This paper describes a fault-tolerant implementation of this structure using atomic actions (atomic transactions) to operate on persistent objects, which are accessed in a distributed setting via a Remote Procedure Call (RPC). The system developed is suited to parallel execution of data and compute intensive programs that require persistent storage and fault tolerance facilities. The suitability of the system is examined in the context of the measured performance of three specific applications; ray tracing, matrix multiplication and Cholesky factorization. The system developed runs on stock hardware and software platforms, specifically UNIX, C++.

NTIS

Workstations; Networks; Computers; Fault Tolerance; Matrices (Mathematics); UNIX (Operating System)

19980016769 National Inst. of Standards and Technology, Gaithersburg, MD USA

Generalized Form Registration Using Structure-Based Techniques

Garris, M. D., National Inst. of Standards and Technology, USA; Grother, P. J., National Inst. of Standards and Technology, USA; Apr. 1996; 16p; In English

Report No.(s): PB96-191374; NISTIR-5726; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A new method for registering forms has been developed at the National Institute of Standards and Technology. This method automatically estimates the amount of rotation and translation in the image without any detailed knowledge of the form. This is accomplished through the automatic detection of dominant vertical and horizontal structures (lines) commonly found in forms. A general method for rotation estimation and a robust method for translation estimation are presented. Results demonstrate that this technique is extremely tolerant to spurious annotations on the form and scanner noise in the image, and the computational requirements of the utility can be tuned by optionally choosing to process and analyze downsampled versions of the image. All 3,669 Handwriting Sample Forms distributed with NIST Special Database 19 were successfully registered with the new technique, and using the same code, 255 uniformly laid out IRS tax forms and 500 Census miniforms were also tested and registered. Every type of form contained in the numerous NIST (public) form databases can be registered using this technique. These results also demonstrate how easy it is to set up the computer to register new types of forms, introducing a set-up interface that is much more automated and less tedious than what is currently required to specify new forms for the NIST public domain Form-Based Handprint Recognition System.

NTIS

Handwriting; Character Recognition; Scanning; Optical Data Processing

19980016774 Atomic Energy of Canada Ltd., Whiteshell Labs, Pinawa, Manitoba Canada

User's Manual and Programmer's Guide for INSDEF: Automated Insertion of Variable Definitions

Sherman, G. R., Atomic Energy of Canada Ltd., Canada; Dec. 1996; 20p; In English

Report No.(s): PB97-135636; COG-96-329-I; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The report is a user's manual and programmer's guide for the computer program INSDEF. It describes the use of the program, and its function and structure. INSDEF is a tool for use in the development of FORTRAN code. It obtains definitions of variables, including specification of their SI physical units, from a data dictionary, and inserts these definitions into the variable declaration section of FORTRAN code as comments. This automation promotes a clear understanding of each variable's contents, and insures that the definitions of variables is consistent wherever they are used.

NTIS

Applications Programs (Computers); Computer Programming; Computer Programs; User Manuals (Computer Programs)

19980016787 National Inst. of Standards and Technology, Manufacturing Systems Integration Div., Gaithersburg, MD USA

Overview of the Manufacturing Engineering Toolkit Prototype

Iuliano, M. J., National Inst. of Standards and Technology, USA; Oct. 1995; 12p; In English

Report No.(s): PB96-128228; NISTIR-5730; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A computer-aided Manufacturing Engineering Toolkit (METK) prototype is currently under development at the National Institute of Standards and Technology (NIST). The toolkit is being used to identify the integration standards and issues which must be addressed to implement plug-compatible environments in the future. The toolkit consists of commercial-off-the-shelf (COTS) manufacturing software applications housed together on a high speed computer workstation. The purpose of the CAME project at NIST is to provide an integrated framework, operating environment, common databases, and interface standards for manufacturing engineering software applications. This paper describes an initial METK prototype.

NTIS

Computer Aided Manufacturing; Prototypes; Workstations

19980016794 National Inst. of Standards and Technology, Gaithersburg, MD USA

Application Software Interface: ISDN Services for an Open Systems Environment

Stokesberry, D. P., National Inst. of Standards and Technology, USA; Feb. 1995; 36p; In English

Report No.(s): PB96-131487; NISTIR-5595; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report provides the specific information required to evaluate the Application Software Interface (ASI) as one component of an Open System Environment (OSE) which might include POSIX, GOSIP, and other specifications to provide the functionality necessary to address a broad range of federal information technology requirements.

NTIS

Communication Networks; Specifications; Evaluation; Requirements; Information Systems; Applications Programs (Computers)

19980016797 National Inst. of Standards and Technology, Information Systems Architecture Div., Gaithersburg, MD USA

Reference Information for the Software Verification and Validation Process

Wallace, D. R., National Inst. of Standards and Technology, USA; Ippolito, L. M., National Inst. of Standards and Technology, USA; Cuthill, B. B., National Inst. of Standards and Technology, USA; Apr. 1996; 96p; In English

Report No.(s): PB96-188164; NIST/SP-500-234; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Computing systems may be employed in the health care environment in efforts to increase reliability of care and reduce costs. Software verification and validation (V&V) is an aid in determining that the software requirements are implemented correctly and completely and are traceable to system requirements. It helps to ensure that those system functions controlled by software are secure, reliable, and maintainable. Software V&V is conducted throughout the planning, development and maintenance of software systems, including knowledge-based systems, and may assist in assuring appropriate reuse of software.

NTIS

Computer Programming; Cost Reduction; Program Verification (Computers); Software Engineering; Software Reuse

19980016802 National Inst. of Standards and Technology, Manufacturing Systems Integration Div., Gaithersburg, MD USA

User's Guide to "SuperFit" Modeling Software for CMM Probe Lobing

Hopp, T. H., National Inst. of Standards and Technology, USA; Oct. 1995; 12p; In English

Report No.(s): PB96-128236; NISTIR-5720; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Superfit is a software package developed by the National Institute of Standards and Technology (NIST) that fits a model of probe lobing to coordinate data obtained by probing a calibration ball. It runs under the Microsoft Windows(TM) 3.1 operating system. This document describes how to use the Superfit software.

NTIS

Applications Programs (Computers); Object-Oriented Programming; Computer Systems Design; Architecture (Computers)

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COMPUTER SYSTEMS

Includes computer networks and special application computer systems.

19980012522 Rutherford Appleton Lab., Computing and Information Systems Dept., Chilton, UK

Numerical Analysis Group Progress Report, Jan. 1994 - Dec. 1995

Duff, I. S., Editor, Rutherford Appleton Lab., UK; Mar. 1996; 63p; In English

Report No.(s): PB96-176151; RAL-TR-96-015; Copyright Waived; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report covers the period from January 1994 to December 1995 and describes work performed by the Numerical Analysis Group within the Computing and Information Systems Department at the Rutherford Appleton Laboratory.

NTIS

Information Systems; Numerical Analysis

19980012538 Japan Atomic Energy Research Inst., Tokyo, Japan

Parallelization of a particle code on shared memory parallel vector computer

Ohta, Toshio, Japan Atomic Energy Research Inst., Japan; Orii, Shigeo, Japan Atomic Energy Research Inst., Japan; Mar. 1997; 28p; In Japanese

Report No.(s): JAERI-Data/Code-97-007; DE97-750694; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A particle code was parallelized by the parallel compiler on the shared memory vector computer T90. The auto-parallelization compiler was found not effective for this code. But the works of inserting parallel directives and using a particular method for vectorization and parallelization make this code about 3.2 times faster than the original performance. The results will be shown with the tuning process and its effect as well as the characteristics of the shared memory parallel computer.

DOE

Parallel Processing (Computers); Plasmas (Physics)

19980012556 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

W3Objects: Bringing Object-Oriented Technology to the Web

Ingham, D. B., Newcastle-upon-Tyne Univ., UK; Little, M. C., Newcastle-upon-Tyne Univ., UK; Caughey, S. J., Newcastle-upon-Tyne Univ., UK; Shrivastava, S. K., Newcastle-upon-Tyne Univ., UK; Apr. 1997; 19p; In English

Report No.(s): PB97-176770; TRS-590; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this paper, the authors discuss some of the problems of the current Web and show how the introduction of object-orientation provides flexible and extensible solutions. New characteristics, such as concurrency control and persistence, can be obtained by inheriting from suitable base classes, without necessarily requiring any changes to users of these resources. The authors describe the W3Object model which the authors have developed based upon these ideas, and show, through a prototype implementation, how they have used the model to address the problems of referential integrity and transparent object (resource) migration. The authors also give indications of future work.

NTIS

World Wide Web; Object-Oriented Programming; Distributed Processing; Computer Systems Simulation

19980012721 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Supporting Highly Manageable Web Services

Ingham, D. B., Newcastle-upon-Tyne Univ., UK; Caughey, S. J., Newcastle-upon-Tyne Univ., UK; Little, M. C., Newcastle-upon-Tyne Univ., UK; Apr. 1997; 16p; In English

Report No.(s): PB97-176796; TRS-592; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper focuses on the management aspects of Web service provision. The authors argue that support for manageability has to be considered at the design stage if services are to be capable of delivering high levels of quality of service for their users. The authors categorize management issues into those concerning a site as a whole and those pertaining to individual services. The

authors approach to site management supports the arbitrary distribution of services to machines, allowing the optimum cost/performance configuration to be selected. Service management issues may be generalized as supporting evolution, for example, supporting changes to the functionality, the presentation logic, and the overall look and feel of a service. The authors' approach, based on the separation of functionality and presentation, allows such changes to be performed on-line and ensures that updates are reflected consistency across the various pages of a service, or across services. This approach also facilitates the development of services that utilize dynamic content for service customizations, such as tailoring a service to match the profile of users.

NTIS

World Wide Web; Dynamic Programming; Flexibility; Systems Engineering; Data Management; Computer Conferencing

19980013650 NERAC, Inc., Tolland, CT USA

Commercialization of Internet. (Latest citations from The Computer Database)

Jan. 1996; In English

Report No.(s): PB96-859764; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the use of Internet for business purposes. Topics include advertising, marketing, government involvement, and interactive technology such as teleshopping and user protocol. Descriptions of specific start-up companies and their online services are included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Internets; Commercialization; Bibliographies

19980013662 Japan Atomic Energy Research Inst., Center for Promotion of Computational Science and Engineering, Tokyo, Japan

Structured grid generator on parallel computers

Muramatsu, Kazuhiro, Japan Atomic Energy Research Inst., Japan; Murakami, Hiroyuki, Fuji Research Inst. Corp., Japan; Higashida, Akihiro, Fuji Research Inst. Corp., Japan; Yanagisawa, Ichiro, Mitsubishi Heavy Industries Ltd., Japan; Mar. 1997; 50p; In Japanese

Report No.(s): JAERI-Data/Code-97-005; DE97-750693; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A general purpose structured grid generator on parallel computers, which generates a large-scale structured grid efficiently, has been developed. The generator is applicable to Cartesian, cylindrical and BFC (Boundary-Fitted Curvilinear) coordinates. In case of BFC grids, there are three adaptable topologies; L-type, O-type and multi-block type, the last of which enables any combination of L- and O-grids. Internal BFC grid points can be automatically generated and smoothed by either algebraic supplemental method or partial differential equation method. The partial differential equation solver is implemented on parallel computers, because it consumes a large portion of overall execution time. Therefore, high-speed processing of large-scale grid generation can be realized by use of parallel computer. Generated grid data are capable to be adjusted to domain decomposition for parallel analysis.

DOE

Structured Grids (Mathematics); Grid Generation (Mathematics); Parallel Computers; Parallel Processing (Computers)

19980013663 Japan Atomic Energy Research Inst., Center for Promotion of computational Science and Engineering, Tokyo, Japan

Survey on present status and trend of parallel programming environments

Takemiya, Hiroshi, Japan Atomic Energy Research Inst., Japan; Higuchi, Kenji, Japan Atomic Energy Research Inst., Japan; Honma, Ichiro, Japan Atomic Energy Research Inst., Japan; Ohta, Hirofumi, Japan Atomic Energy Research Inst., Japan; Kawasaki, Takuji, Japan Atomic Energy Research Inst., Japan; Imamura, Toshiyuki, Japan Atomic Energy Research Inst., Japan; Koide, Hiroshi, Japan Atomic Energy Research Inst., Japan; Akimoto, Masayuki, Japan Atomic Energy Research Inst., Japan; Mar. 1997; 111p; In Japanese

Report No.(s): JAERI-Review-97-005; DE97-750706; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This report intends to provide useful information on software tools for parallel programming through the survey on parallel programming environments of the following six parallel computers, Fujitsu VPP300/500, NEC SX-4, Hitachi SR2201, Cray T94, IBM SP, and Intel Paragon, all of which are installed at Japan Atomic Energy Research Institute (JAERI), moreover, the present status of R and D's on parallel softwares of parallel languages, compilers, debuggers, performance evaluation tools, and integrated

tools is reported. This survey has been made as a part of our project of developing a basic software for parallel programming environment, which is designed on the concept of STA (Seamless Thinking Aid to programmers).

DOE

Parallel Programming; Programming Environments

19980014097 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Compositional Petri Nets in Protocol Engineering

Anisimov, N. A., Newcastle-upon-Tyne Univ., UK; Koutny, M., Newcastle-upon-Tyne Univ., UK; Feb. 1997; 48p; In English
Report No.(s): PB97-179782; TRS-575; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The paper addresses the problem of designing communication protocols within a framework based on Petri nets and supporting compositionality of structure and behavior. After pointing out that compositionality is an inherent feature of protocols, and as such should be supported by adequate formal basis, the authors outline a systematic approach to the design of protocol systems. The external behavior of entities is characterized using the notion of a bisimulation equivalence. At the lower level of design, the authors show how entities can be constructed from protocol procedures using suitable composition rules, such as sequence, iteration, and disabling. They then discuss the relationship between syntactical and semantical (behavioral) notions of compositionality.

NTIS

Petri Nets; Synchronism; Sequential Computers; Protocol (Computers)

19980015146 Arizona Univ., Dept. of Electrical and Computer Engineering, Tucson, AZ USA

Parallel Error Coding Decoding for Highly Parallel Memories Final Report, 1 Aug. 1993 - 31 Mar. 1997

Neifeld, Mark A., Arizona Univ., USA; Aug. 20, 1997; 4p; In English

Contract(s)/Grant(s): F49620-93-I-0477; F49620-94-I-0303

Report No.(s): AD-A329704; AFOSR-TR-97-0465; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Optical storage systems offer the potential for drastically increased data transfer rates through the use of parallel access. It is unrealistic however, to devote conventional serial electronic error correction hardware to such a large number (i.e., $10(\exp 3) - 10(\exp 6)$) of data channels. We have focused therefore, on the development and evaluation of parallel error correction schemes for use with parallel optical memories. The principal focus of this work has been on the development, evaluation, and demonstration of parallel ECC algorithm and implementations for use with parallel access optical storage media. With volume holographic parallel access memories in mind, we have developed parallel ECC schemes that demonstrate burst error tolerance and low area overhead (i.e., high code rate). Further, these new schemes map well onto VLSI hardware and efficient electronic parallel implementations have been demonstrated. Specific research results include (1) Extension of conventional serial 1D codes to 2D, (2) Design and fabrication of 2D parallel decoders (electronic and optoelectronic), (3) Optimization of capacity gain achieved through ECC, (4) Characterization of crosstalk noise in holographic storage and development of detection and apodization techniques for its mitigation, (5) A comprehensive study of optical system design issues and their impact on volume storage capacity and density.

DTIC

Channels (Data Transmission); Crosstalk; Design Analysis; Error Analysis; Fault Tolerance; Holography

19980015200 Carnegie-Mellon Univ., Dept. of Computer Science, Pittsburgh, PA USA

Semantics-Based Parallel Cost Models and Their Use in Provably Efficient Implementations

Greiner, John, Carnegie-Mellon Univ., USA; Apr. 26, 1997; 229p; In English

Contract(s)/Grant(s): F33615-93-1-1330; F19628-91-C-0168

Report No.(s): AD-A330964; CMU-CS-97-113; No Copyright; Avail: CASI; A11, Hardcopy; A03, Microfiche

Understanding the performance issues of modern programming language execution can be difficult. These languages have abstract features, such as higher-order functions, laziness, and objects, that ease programming, but which make their mapping to the underlying machine more difficult. Understanding parallel languages is further complicated by the need to describe what computations are performed in parallel and how they are affected by communication and latency in the machine. This lack of understanding can obscure even the asymptotic performance of a program and can also hide performance bugs in the language implementation. The dissertation introduces a framework of provably efficient implementations in which performance issues of a language can be defined and analyzed. We define several language models, each consisting of an operational semantics augmented with the costs of execution. In particular, the dissertation examines three functional languages based on fork-and-join parallelism, speculative parallelism, and data-parallelism, and it examines their time and space costs. We then define implementations of each language model onto several common machine models, prove these implementations correct, and derive their costs. Each of these implementations uses an intermediate model based on an abstract machine to stage the overall implementation. The

abstract machine executes a series of steps transforming a stack of active states and store into new states and store. The dissertation proves the efficiency of the implementation by relating the steps to the parallel traversal of a computation graph defined in the augmented operational semantics. Provably efficient implementations are useful for programmers, language implementors and language designers.

DTIC

Languages; Programmers; Programming Languages; Semantics

19980015213 NERAC, Inc., Tolland, CT USA

Token Ring Computer Network Protocols. (Latest Citations from the INSPEC Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864590; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the token ring networking protocol. The token ring protocol is a local area network (LAN) protocol designed around a ring and circulating permission token. Each access to the data ring is controlled by the token as it is passed around the network. This approach provides a very decentralized system which is immune to single component failures. Various LAN topologies are compared including Ethernet, MAC and ISO. IBM has selected the token ring protocol for their personal computer local area network products.

NTIS

Bibliographies; Computer Networks; Communication Networks; Design Analysis; Rings (Mathematics)

19980015340 Mitsubishi Electric Corp., Tokyo, Japan

Mitsubishi Denki Giho, Volume 69

1995; 100p; In Japanese; Portions of this document are not fully legible

Report No.(s): PB96-129622; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Reports of client server technology and applications at Mitsubishi Electric are presented.

NTIS

Research Projects; Client Server Systems; Technology Utilization

19980015346 NERAC, Inc., Tolland, CT USA

Local Area Networks: Simulation Models. (Latest citations from the INSPEC Database)

Jan. 1996; In English

Report No.(s): PB96-859376; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning simulation and modeling technologies to predict and evaluate the performance of local area networks (LANS). The design and implementation of architectures and protocols for the integration of voice, data, and image services in LANS systems are discussed. Topics include hybrid access protocols, ethernet in real time systems, CSMA/CD access methods, picturing LANS systems, local broadcast networks, manufacturing and industrial automation, network stability and message transmission, discret event simulation, SIMAN simulation, and system simulation languages. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Local Area Networks; Computerized Simulation; Computer Systems Simulation; Mathematical Models

19980015747 Stanford Univ., Dept. of Computer Science, Stanford, CA USA

Detecting Redundant Tuples during Query Evaluation

Chaudhuri, S., Stanford Univ., USA; Jun. 1992; 238p; In English

Report No.(s): PB96-149513; STAN-CS-92-1433; Copyright Waived; Avail: CASI; A11, Hardcopy; A03, Microfiche

While the relational query languages are declarative, they have been found to have inadequate expressive power. The query language Datalog extends the querying abilities of the relational languages. The bottom-up evaluation techniques have been developed to compute datalog queries. During bottom-up evaluation of a datalog query, many tuples become redundant, i.e., they are no longer needed for the remainder of the evaluation. The detection of redundant tuples can be useful for enhancing concurrency and memory utilization. In this thesis, the authors provide a framework for detecting redundant tuples during bottom-up evaluation of datalog queries. The authors show that by a set of auxiliary runtime tests that extend a bottom-up evaluation, they can detect

redundant tuples at runtime. Using a compile-time analysis, the authors determine the datalog queries for which detecting redundant tuples is attractive.

NTIS

Query Languages; Architecture (Computers); Computer Programs

19980015753 Nippon Electric Co. Ltd., Tokyo, Japan

NEC Technical Journal. Serial 319: Special Issue on NEC Computer Parallel ACOS Series, Volume 48

Sep. 1995; 136p; In Japanese; Portions of this document are not fully legible

Report No.(s): PB96-129432; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Contents include the following: Remarks for Special Issue on NEC Computer Parallel ACOS Series; Background and Outline of Parallel ACOS Series; AX7300 Central Processing Unit; PX7500 Central Processing Unit; PX7800 Central Processing Unit; Technology for Parallel ACOS Series; Multi-System Control Facility; Operation Unit (System Support Unit); Technology of reliability of the Parallel ACOS Series; High-speed/Large-capacity Disk Array Subsystem; Development of the Front End Network Processor N3805; Product Outline of Operating System ACOS-2/XP; Product Outline of ACOS-4/XVP PX; Parallel Processing (Parallel OLTP, Parallel Batch, Parallel SQL); Clustered Systems by ACOS-4/XVP PX; Cooperation with Open Systems; Fundamental Architecture of ACOS-4/XVP PX; New Network Control Manager.

NTIS

Parallel Processing (Computers); Parallel Computers

19980016138 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

System Management of the ICL GOLDRUSH Parallel Database Server

Watson, P., Newcastle-upon-Tyne Univ., UK; Ward, M., Newcastle-upon-Tyne Univ., UK; Hoyle, K., Newcastle-upon-Tyne Univ., UK; Mar. 1996; 12p; In English

Report No.(s): PB96-179650; TRS-548; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Goldrush MegaSERVER is a very high performance parallel database server sold by ICL. The design of the System Management of GOLDRUSH is the focus of this paper. It differs from conventional System Management as it must support both the underlying parallel machine and the business critical applications which run on it. We describe the requirements placed on System Management by this class of machine, and how these were met in the design of the GOLDRUSH management system: we explain both the management architecture and the management tools themselves. Finally in light of experience in the use of these tools, we point to future directions for work in this area.

NTIS

Systems Management; Management Systems; Data Bases; Parallel Processing (Computers)

19980016149 NERAC, Inc., Tolland, CT USA

Cable Television. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-863923; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning cable television (CATV) transmission, converter systems, signal substitution, distribution systems, channel selection, power supply, and faulty detection. Two-way CATV systems for local communications and control of subscriber access to CATV programs are discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Cable Television; Television Systems

19980016615 National Inst. of Standards and Technology, Distributed Systems Engineering, Gaithersburg, MD USA

Distributed Systems: Survey of Open Management Approaches

Hungate, J., National Inst. of Standards and Technology, USA; Fernandes, G., National Inst. of Standards and Technology, USA; Sep. 21, 1995; 34p; In English

Report No.(s): PB96-128202; NISTIR-5735; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Networks and distributed systems are becoming critical for the working of many enterprises. Traditionally, tools necessary to perform effective system management were inherent to proprietary operating systems and dealt with user and resource allocation and administration. With the introduction of local area networks (LANs), distributed computing environments started to

develop. System management tools were enhanced with network management facilities, but rarely in an integrated fashion. Management services, providing mechanisms to monitor and control a great diversity of components and user interactions with these components, and an integrated approach to assure consistency are just now being addressed by standard development organizations and user consortia. The report gives an overview of some existing approaches proposed by different organizations: IEEE POSIX Working Group P1003.0, X/Open, ISO/IEC, and the Network Management Forum (NMF).

NTIS

Local Area Networks; Resource Allocation

19980016646 National Inst. of Standards and Technology, Advanced Systems Div., Gaithersburg, MD USA

Using S-Check, Alpha Release 1.0

Snelick, R. D., National Inst. of Standards and Technology, USA; Drouin, N. V., National Inst. of Standards and Technology, USA; Antonishek, J. K., National Inst. of Standards and Technology, USA; Feb. 1996; 54p; In English

Report No.(s): PB96-165964; NISTIR-5789; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

S-Check is a tool for detecting performance bottlenecks in programs on computer systems with multiple processors. S-Check automates the techniques of Synthetic Perturbation Screening. Synthetic Perturbation Screening systematically perturbs selected program code segments and determines performance sensitivities of these selected segments by using the statistical techniques of Design of Experiments. The resulting sensitivity analysis serves as a basis for performance evaluations. This document serves as a user's guide for S-Check.

NTIS

Statistical Analysis; Perturbation; Parallel Processing (Computers); Performance Prediction; Checkout

19980016813 National Inst. of Standards and Technology, Distributed Systems Engineering, Gaithersburg, MD USA

Comparison of POSIX Open System Environment (OSE) and Open Distributed Processing (ODP) Reference Models

Fernandes, G., National Inst. of Standards and Technology, USA; Hungate, J., National Inst. of Standards and Technology, USA; Nov. 13, 1995; 26p; In English

Report No.(s): PB96-131495; NISTIR-5736; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This report presents two existing reference models for describing distributed systems. These models are the Open Distributed Processing reference model and the POSIX OSE reference model. They both address distributed open systems, but from different perspectives, with different objectives and methodology. After a brief description of the two models, a comparison is made referring in particular to the extent distributed systems management is accommodated in both models.

NTIS

Models; Standardization; Distributed Processing; Systems Management

63 CYBERNETICS

Includes feedback and control theory, artificial intelligence, robotics and expert systems. For related information see also 54 Man/ System Technology and Life Support.

19980012517 Vrije Univ., Faculteit der Wiskunde en Informatica, Amsterdam, Netherlands

Incremental Learning from Decision Tables: A Neural Network Approach

Kowalczyk, W., Vrije Univ., Netherlands; Dec. 1994; 21p; In English

Report No.(s): PB96-159991; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We present an algorithm for training feed-forward neural networks on decision tables. The most significant property of our algorithm is its cumulative behavior: the more computational effort is invested in training the more knowledge is encoded in the network. Thus, in contrast to conventional training algorithms, like backpropagation, our algorithm always produces a network that 'knows something' about the given decision table. Moreover, although the algorithm is based on the translation of the training problem into a mixed linear programming problem, it provides a framework for applications of other techniques developed for handling problems of combinatorial optimization like Heuristic Search, Constraint Satisfaction, Genetic Algorithms or Neural Networks.

NTIS

Machine Learning; Neural Nets; Decision Making; Algorithms

19980015171 Rochester Univ., Dept. of Computer Science, NY USA

The Design and Implementation of the TRAINS-96 System: A Prototype Mixed-Initiative Planning Assistant

Ferguson, George M., Rochester Univ., USA; Allen, James F., Rochester Univ., USA; Miller, Brad W., Rochester Univ., USA; Ringger, Eric K., Rochester Univ., USA; Oct. 1996; 173p; In English

Contract(s)/Grant(s): N00014-95-1-1088, \ F30602-951; F30602-95-I-0025; NSF IRI-96-23665

Report No.(s): AD-A329931; TRAINS-TN-96-5; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This document describes the design and implementation of TRAINS-96, a prototype mixed-initiative planning assistant system. The TRAINS-96 system helps a human manager solve routing problems in a simple transportation domain. It interacts with the human using spoken, typed, and graphical input and generates spoken output and graphical map displays. The key to TRAINS-96 is that it treats the interaction with the user as a dialogue in which each participant can do what they do best. The TRAINS-96 system is intended as both a demonstration of the feasibility of realistic mixed-initiative planning and as a platform for future research. This document describes both the design of the system and such features of its use as might be useful for further experimentation. Further references and a comprehensive set of manual pages are also provided.

DTIC

Display Devices; Prototypes

19980015378 NERAC, Inc., Tolland, CT USA

Kalman Filters. (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-863972; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design and applications of Kalman filters. Applications in process control, air pollution control, navigational systems, radar tracking, electronic devices, antenna arrays, communications, and noise measurements are discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Kalman Filters

19980015404 Integrated Systems, Inc., Sunnyvale, CA USA

Unified Controller Design for Intelligent Manufacturing Automation Final Report, 15 Oct. 1993 - 14 May 1997

Kosut, Robert, Integrated Systems, Inc., USA; Aral, Gurcan, Integrated Systems, Inc., USA; May 14, 1997; 82p; In English

Contract(s)/Grant(s): F49620-94-C-0003

Report No.(s): AD-A329690; AFOSR-97-0310TR; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The proposed objective was to develop a unified controller design methodology for manufacturing automation systems and to demonstrate the approach on a manufacturing process of interest to DARPA. The demonstration system selected was rapid thermal processing (RTP) of semiconductor wafers. This novel approach in integrated circuit manufacturing demands fast tracking control laws that achieve near uniform spatial temperature distributions. In order to ensure the final product quality, it is essential to maintain a uniform temperature profile despite uncertainties in both transient and steady state phases of the process. Specific accomplishments included the development of mathematical and computational tools for heat transfer modeling, specifically conduction and multiband radiation, nonlinear model reduction, methods for robust thermal control, and an approach applicable to repetitive run-to-run feed forward learning control. All the results were tested for feasibility on commercial RTP chambers.

DTIC

Semiconductors (Materials); Software Development Tools; Temperature Control; Temperature Distribution; Temperature Profiles; Automatic Control; Control Theory

19980015441 Royal Inst. of Tech., Dept. of Mathematics, Stockholm, Sweden

PI Controllers for an Elastic Two-Mass System: Optimization and Systems Theory

Galardini, D. G., Royal Inst. of Tech., Sweden; Nordin, M., Royal Inst. of Tech., Sweden; Galic, J., ABB Corporate Research, Sweden; Dec. 08, 1995; 27p; In English

Report No.(s): PB96-173265; TRITA/MAT-95/OS-11; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A variety of practical engineering systems can be modeled as two-mass systems. In industry applications these are usually controlled by Proportional Integral controllers, the empiric tuning rule being 'higher gains-better performance' when a time integral performance criterium is optimized and a linear plant model used. Here we are shown how this rule obviously falls and that on the contrary a more accurate analysis gives limit values for the proportional and integral gains, that can be expressed as a function of the plant parameters. Moreover, it is shown that time integral performance criteria could be used in a PI controller tuning

taking the nonlinearities into account. The resulting gains fit into the established bounds. Performance and robustness of the resulting controllers are demonstrated on a industrial interesting example.

NTIS

Controllers; Systems Engineering; Velocity; Robustness (Mathematics); Control Theory

19980015920 Stanford Univ., Dept. of Computer Science, Stanford, CA USA

Random Networks in Configuration Space for Fast Path Planning

Kavraki, L. E., Stanford Univ., USA; Dec. 1994; 150p; In English

Report No.(s): PB96-149703; STAN-CS-TR-95-1535; Copyright Waived; Avail: CASI; A07, Hardcopy; A02, Microfiche

In the main part of this dissertation we present a new path planning method which computes collision-free paths for robots of virtually any type moving among stationary obstacles. This method proceeds according to two phases: a preprocessing phase and a query phase. In the preprocessing phase, a probabilistic network is constructed and stored as a graph whose nodes correspond to collision-free configurations and edges to feasible paths between these configurations. In the second part of this dissertation, we present a new method for computing the obstacle map used in motion planning algorithms. The method, which is practical only for two-dimensional workspaces, computes a convolution of the workspace and the robot with the use of the Fast Fourier Transform (FFT). It is particularly promising for workspaces with many and/or complicated obstacles, or when the shape of the robot is not simple. Furthermore, it is an inherently parallel method that can significantly benefit from existing experience and hardware on the FFT. In the third part, we consider a problem from assembly planning. In assembly planning we are interested in generating feasible sequences of motions that construct a mechanical product or take it apart to its individual parts.

NTIS

Robots; Computer Networks; Preprocessing; Computer Systems Programs; Statistical Distributions

19980016311 Fuji Electric Co. Ltd., Tokyo, Japan

Fuji Electric Review, Volume 41

1995; 31p; In English

Report No.(s): PB96-129556; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Contents include the following: Trends and Tasks of the Integrated Control System; Operator Station for the Integrated Control System MICREX-IX; Computer Linkage Function for the Integrated Control System MICREX-IX; Control Station for the Integrated Control System MICREX-IX; I/O System for the Integrated Control System MICREX-IX; and Present Status and Future Prospects of an Engineering Environment for Integrated Control Systems.

NTIS

Input/Output Routines; Environmental Control; Integrated Energy Systems; Control Equipment

19980016573 National Inst. of Standards and Technology, Intelligent Systems Div., Gaithersburg, MD USA

Technology Requirement to Implement Improved Situation Awareness: Machine Perception

Albus, James S., National Inst. of Standards and Technology, USA; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 8p; In English; Also announced as 19980016571; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

Situation awareness is the ability of an unmanned vehicle intelligent control system to model the world. A world model is an intelligent system's current internal estimate of the state of the world, plus its prior knowledge of the history of the world, plus knowledge about the rules of physics and mathematics, plus rules of behavior, task skills, and basic values. World modeling is the ability of the intelligent system to maintain and use a world model to predict and filter sensory experience, to understand the past, and to simulate the future. Perception is the functional transformation of data from sensors into situational awareness.

Author

Mathematical Models; Human Factors Engineering; Artificial Intelligence; Decision Making; Machine Learning; Decision Support Systems

19980016645 NERAC, Inc., Tolland, CT USA

Robot Motion Controls: Latest Citations from the INSPEC Database

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-862891; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, development, and methods of motion control systems for robotics. Citations examine acceleration feedback, PDF subvariable, compliant, adaptive, neural network, and fuzzy rule based algorithms. Applications include mobile, surgical, subsea, and industrial robots.

NTIS

Elastic Properties; Neural Nets; Robot Dynamics; Robotics; Robots

19980016668 NERAC, Inc., Tolland, CT USA

Intelligent User Interfaces (Latest Citations from the INSPEC Database)

Dec. 1995; In English; Page count unavailable

Report No.(s): PB96-855853; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development of intelligent user interfaces for use in information and communication systems. Knowledge-based systems and expert systems for the design, evaluation, implementation, and operation of user interface systems are discussed. Topics include graphical user interface, relational databases, user interface languages, and adaptive dialogues. Citations also discuss applications in flexible manufacturing systems, health monitoring, documentation, decision support systems, handicapped aids, optimal control systems, and biocommunication. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Information Systems; Telecommunication; Expert Systems

19980016676 NERAC, Inc., Tolland, CT USA

Blackboard Systems: Communication Between Artificial Intelligence Modules (Latest Citations from the INSPEC Database)

Dec. 1995; In English; Page count unavailable

Report No.(s): PB96-855846; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, architectures, implementation, applications, and selection of blackboard architectures. The interaction between blackboard systems and the artificial intelligence modules with which they communicate is discussed. Also examined are real time and non-real time implementations, diagnostic systems, power system operations, mechanical analysis, decision support, process planning, recognition systems, robotics, biomedical systems, avionics, mission planning, manufacturing control, and sensor fusion. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Artificial Intelligence; Bibliographies

19980016725 Office of Naval Research, Arlington, VA USA

Applications of Active Control

Ng, Kam W., Office of Naval Research, USA; Seals/Secondary Flows Workshop 1996; Oct. 1997; Volume 2, pp. 731-773; In English; Also announced as 19980016712; Original contains color illustrations; No Copyright; Avail: Issuing Activity (R and T Directorate, Lewis Research Center, Cleveland, OH 44135), Hardcopy, Microfiche

Active control of noise and vibration has received a great deal of attention in recent years. Accordingly, substantial progress has been made in understanding of the principle, development, and applications of the active control technique. This presentation focuses on the acoustic and non-acoustic applications of active control technology. Specifically, implementations toward noise and vibration control, control of dynamical systems, and processes are presented. Research and development efforts in active/passive control are also discussed. Technical issues, such as broadband control, transient operation, complex structures and systems, and controller instability are addressed. Furthermore, recommendations and future research directions are discussed.

Author

Active Control; Dynamical Systems; Noise Reduction; Vibration Damping; Smart Structures; Signal Processing; Signal Detection; Wavelet Analysis; Fault Detection; Robot Sensors

19980016808 North Carolina State Univ., Dept. of Civil Engineering, Raleigh, NC USA

Robotic Bridge Paint Removal: Field Testing and Evaluation of Promising Technologies Final Report, Jul. 1993 - Sep. 1994

Bernold, L. E., North Carolina State Univ., USA; Moon, S., North Carolina State Univ., USA; Dec. 1995; 35p; In English
Report No.(s): PB96-165303; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Periodic paint removal and re-application is necessary to protect steel girder bridges against corrosion. The Robotic Bridge Paint Removal (RBPR) project was initiated under a grant agreement with Federal Highway Administration (FHWA) to study the important factors related to the robotic paint removal process. The robotic paradigm was identified as an especially effective approach for spot cleaning corroded paint on bridge structures. A vision-based computer control architecture was developed that provides the adaptive remote control capabilities for the spot cleaning process. Field tests were conducted throughout the project to evaluate design concepts, identify areas that could be improved, and demonstrate the final working prototype.

NTIS

Robotics; Paint Removal; Bridges (Structures); Cleaning; Prototypes

64

NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

19980012610 Royal Inst. of Tech., Dept. of Mathematics, Stockholm, Sweden

Linear Least-Squares Problems with Diagonally Dominant Weight Matrices

Forsgren, A., Royal Inst. of Tech., Sweden; Mar. 1995; 32p; In English

Report No.(s): PB96-173315; TRITA/MAT-95/OS-2; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The solution of the unconstrained weighted linear least-squares problem is known to be a convex combination of the basic solutions formed by the non-singular subsystems if the weight matrix is diagonal and positive definite. In particular, this implies that the norm of this solution is uniformly bounded for any diagonal and positive definite weight matrix. In addition, the solution set is known to be the relative interior of a finite set of polytopes if the weight matrix varies over the set of positive definite diagonal matrices. In this paper, these results are reviewed, and generalized to the set of weight matrices that are symmetric, positive semi-definite, diagonally dominant and give unique solution to the least-squares problem. This is done by means of a particular symmetric diagonal decomposition of the weight matrix, giving a finite number of a diagonally weighted problems, but in a space of higher dimension. Extensions to equality-constrained weighted linear least-squares problems are given. A discussion of why the boundedness properties do not hold for general symmetric positive definite weight matrices is given. The motivation for this research is from interior methods for optimization.

NTIS

Matrices (Mathematics); Motivation

19980013151 Vrije Univ., Faculteit der Wiskunde en Informatica, Amsterdam, Netherlands

Problems in Rewriting 3

Dershowitz, N., Vrije Univ., Netherlands; Jouannaud, J. P., Vrije Univ., Netherlands; Klop, J. W., Vrije Univ., Netherlands; Feb. 1995; 15p; In English

Report No.(s): PB96-159983; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We presented lists of open problems in the theory of rewriting in the proceedings of the previous two conferences, the 3rd and 4th InterNational Conferences on Rewriting Techniques and Applications. We continue with that tradition this year. We give references to solutions to eleven problems from the previous lists, report on progress on several others, provide a few reformulations of old problems, and include ten new problems.

NTIS

Calculus; Theorem Proving; Convergence; Canonical Forms; Algorithms

19980013152 Center for Mathematics and Computer Science, Amsterdam, Netherlands

HomCont: An Auto86 Driver for Homoclinic Bifurcation Analysis, 2.0

Champneys, A. R., Bristol Univ., UK; Kuznetsov, Y. A., Center for Mathematics and Computer Science, Netherlands; Sandstede, B., Weierstrass Inst. fuer Angewandte Analysis, Germany; Jul. 1995; 43p; In English

Report No.(s): PB96-168208; AM-R-9516; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

HomCont, an Auto86-based toolbox for homoclinic bifurcation analysis, is described in detail. The toolbox allows the continuation of codimension-one homoclinic orbits to hyperbolic and non-hyperbolic equilibria, as well as detection and continuation of higher-order homoclinic singularities in more parameters. All known codim 2 cases that involve a unique homoclinic orbit are

supported, and certain heteroclinic computations are also possible. The document contains details on the various files supplied with HomCont and how to use them to analyse several tutorial examples.

NTIS

Singularity (Mathematics); Ill-Posed Problems (Mathematics)

19980013898 New Mexico Univ., Dept. of Mathematics and Statistics, Albuquerque, NM USA

Locating the Discontinuities of a Bounded Function by the Partial Sums of its Fourier Series I: Periodical Case

Kvernadze, George, New Mexico Univ., USA; Hagstrom, Thomas, New Mexico Univ., USA; Shapiro, Henry, New Mexico Univ., USA; Dec. 1997; 32p; In English

Contract(s)/Grant(s): NAG3-2014; NSF DMS-93-04406; NSF DMS-96-00146; RTOP 538-03-11

Report No.(s): NASA/CR-1997-206534; NAS 1.26:206534; E-11018; ICOMP-97-13; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A key step for some methods dealing with the reconstruction of a function with jump discontinuities is the accurate approximation of the jumps and their locations. Various methods have been suggested in the literature to obtain this valuable information. In the present paper, we develop an algorithm based on identities which determine the jumps of a $2(\pi)$ -periodic bounded not-too-highly oscillating function by the partial sums of its differentiated Fourier series. The algorithm enables one to approximate the locations of discontinuities and the magnitudes of jumps of a bounded function. We study the accuracy of approximation and establish asymptotic expansions for the approximations of a $27(\pi)$ -periodic piecewise smooth function with one discontinuity. by an appropriate linear combination, obtained via derivatives of different order, we significantly improve the accuracy. Next, we use Richardson's extrapolation method to enhance the accuracy even more. For a function with multiple discontinuities we establish simple formulae which "eliminate" all discontinuities of the function but one. Then we treat the function as if it had one singularity following the method described above.

Author

Fourier Series; Discontinuity; Algorithms

19980014081 Royal Inst. of Tech., Dept. of Mathematics, Stockholm, Sweden

Partitions of $R(\sup 3)$ into Curves

Jonsson, M., Royal Inst. of Tech., Sweden; Waestlund, J., Royal Inst. of Tech., Sweden; Feb. 28, 1996; 14p; In English

Report No.(s): PB97-100671; TRITA-MAT-96-MA-04; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A general technique for obtaining partitions of $R(\sup 3)$ into curves satisfying various properties is presented. The method can be used to partition $R(\sup 3)$ into unlinked circles of radius one, which answers a question posed by Wilker (4), or into arbitrary collections of real analytic curves. We also apply the method to study the set of bijections of the open unit disk.

NTIS

Curves (Geometry); Partitions; Theorems; Disks

19980014082 National Defence Research Establishment, Dept. of Weapons and Protection, Stockholm, Sweden

Boundary Element Method for Calculating Added Mass Matrices *Randvaerdesmetod foer Beraekning av Adderade Mass-matriser*

Helte, A., National Defence Research Establishment, Sweden; Jun. 1996; 14p; In English; Figures in this document may not be legible in microfiche

Report No.(s): PB97-101224; FOA-R-96-00259-2.5-SE; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In the project 'Motmedel under vatten' at FOA countemeasures against torpedos are studied. One method is to use torpedo against attacking torpedo, so called antitorpedo-torpedo. An essential part in this work consist of correctly describing the defense-torpedos equation of motion. The torpedos motion in water depends on several factors, which roughly can be divided in to three parts: external and internal forces, viscous effects och acceleration effects. In the report the authors will discuss the acceleration effects, which can be described by an added mass matrix. A boundary element method is presented to numerically calculate the added mass matrix M of a rotationally symmetric body with fins. They discuss how to handle infinite 'charge densities' arising at the fins, and how the distribution of node points affects the convergence. Results are presented for an elongated body with four fins, resembling a torpedo, for different number of node points. The error in M for the finest grid is estimated to be less than 1%.

NTIS

Boundary Element Method; Equations of Motion; Viscous Flow

19980014099 Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette, France

Iterating the Poincare Normalization

Gaeta, G., Institut des Hautes Etudes Scientifiques, France; Oct. 1996; 15p; In English

Report No.(s): PB97-138721; IHES/P/96/71; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

By a careful exploitation of higher order effects - which requires the solution of 'higher order homological equations' - we show that the Poincare normalization procedure can be iterated (n times) to produce a simplified (n-th) normal form; this simplification is closely related to the non-uniqueness of the standard normal form. The proposed procedure is completely constructive.

NTIS

Space; Homology; Poincare Problem; Theorems; Simplification

19980014108 Stanford Univ., Dept. of Mathematics, Stanford, CA USA

Research on the Estimation of Locally Stationary and Related Processes Progress Report, 1 Sep. 1996 - 31 Aug. 1997

Papanicolaou, George, Stanford Univ., USA; Sep. 18, 1997; 5p; In English

Contract(s)/Grant(s): N00014-96-I-0719

Report No.(s): AD-A331079; SPO-15146; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The main objective of our research is the modeling, analysis, simulation and estimation of locally stationary signals, time series, data, images, etc. We have made an important advance in the statistical analysis of aerothermal data. We have shown that they fit very well into models of locally power law processes and we have estimated effectively and accurately the structure of the power and the log intercept. Our results are different from those previous analyses had produced and could have quite significant impact in our understanding of laser beam propagation in the atmosphere. The analytical and statistical methods that we use are of general interest and can be used in many other situations where local power law processes arise.

DTIC

Statistical Analysis; Time Series Analysis

19980014213 Xerox Palo Alto Research Center, CA USA

Supernodal Approach to Sparse Partial Pivoting

Demmel, J. W., Xerox Palo Alto Research Center, USA; Eisenstat, S. C., Xerox Palo Alto Research Center, USA; Gilbert, J. R., Xerox Palo Alto Research Center, USA; Li, X. S., Xerox Palo Alto Research Center, USA; Liu, J. W. H., Xerox Palo Alto Research Center, USA; 1995; 41p; In English

Report No.(s): PB96-165527; CSL-P95-3; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

We investigate several ways to improve the performance of sparse LU factorization with partial pivoting, as used to solve unsymmetric linear systems. to perform most of the numerical computation in dense matrix kernels, we introduce the notion of unsymmetric supernodes. to better exploit the memory hierarchy, we introduce unsymmetric supernode-panel updates and two-dimensional data partitioning. to speed up symbolic factorization, we use Gilbert and Peierl's depth-first search LU code using all these ideas. We present experiments demonstrating that it is significantly faster than earlier partial pivoting codes. We also compare performance with UMFPACK, which uses a multifrontal approach; our code is usually faster.

NTIS

Algorithms; Linear Systems; Factorization; Matrix Methods

19980014447 NERAC, Inc., Tolland, CT USA

Pattern Recognition: Computational Geometry. (Latest Citations from the INSPEC Database)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-862826; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning theoretical aspects and applications of computational geometry techniques in pattern recognition studies. Computerized picture processing, object construction, representation structures, contour fitting methods, and recognition algorithms are among the topics discussed. Applications in biomedicine, computer graphics, machine vision, and information processing are included.(Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Computational Geometry; Pattern Recognition

19980014561 Institute of Nuclear Chemistry and Technology, Warsaw, Poland

Function approximation with polynomial regression splines *Aproksymacja za pomoca wielomianowych regresyjnych funkcji sklepanych*

Urbanski, Piotr, Institute of Nuclear Chemistry and Technology, Poland; 1996; ISSN 1425-7351; 12p; In Polish
Report No.(s): INCT-10/B/96; DE97-621487; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Principles of the polynomial regression splines as well as algorithms and programs for their computation are presented. The programs prepared using software package MATLAB are generally intended for approximation of the X-ray spectra and can be applied in the multivariate calibration of radiometric gauges. (author).

DOE

Algorithms; Applications Programs (Computers); Regression Analysis; Polynomials; X Ray Fluorescence; Interpolation

19980014801 Carnegie-Mellon Univ., Dept. of Computer Science, Pittsburgh, PA USA

Efficient Representation and Validation of Logical Proofs

Necula, George C., Carnegie-Mellon Univ., USA; Lee, Peter, Carnegie-Mellon Univ., USA; Oct. 1997; 74p; In English
Contract(s)/Grant(s): F19628-95-C-0050; ARPA Order C533

Report No.(s): AD-A332310; CMU-CS-97-172; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report describes a framework for representing and validating formal proofs in various axiomatic systems. The framework is based on the Edinburgh Logical Framework (LF) but is optimized for minimizing the size of proofs and the complexity of proof validation, by removing redundant representation components. Several variants of representation algorithms are presented with the resulting representations being a factor of 15 smaller than similar LF representations. The validation algorithm is a reconstruction algorithm that runs about 7 times faster than LF typechecking. We present a full proof of correctness of the reconstruction algorithm and hints for the efficient implementation using explicit substitutions. We conclude with a quantitative analysis of the algorithms.

DTIC

Theorem Proving; Algorithms

19980015149 Royal Inst. of Tech., Dept. of Mathematics, Stockholm, Sweden

L(sup p)-Estimates for Doubly Oscillatory Fourier Transforms I

Walther, B. G., Royal Inst. of Tech., Sweden; Apr. 18, 1997; 10p; In English; Figures in this document may not be legible in microfiche

Report No.(s): PB97-209076; TRITA-MAT-97-MA-08; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

In this paper we will study maximal estimates for a class of solutions to: $\Delta(\text{sub } x, y) \leq \omega \text{ equal } z_i \Delta \text{sub } t \omega \text{ equal } \text{sub } 7, a = 2$.

NTIS

Fourier Transformation; Partial Differential Equations

19980015150 Royal Inst. of Tech., Dept. of Mathematics, Stockholm, Sweden

Regularity of a Free Boundary at the Infinity Point

Karp, L., Royal Inst. of Tech., Sweden; May 07, 1997; 28p; In English; Figures in this document may not be legible in microfiche
Report No.(s): PB97-209084; TRITA-MAT-97-MA-18; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The regularity of free boundaries, arising in the obstacle problem, was studied by L.A. Caffarelli. This paper deals with the infinity-point version of Caffarelli's result.

NTIS

Free Boundaries; Theorems; Problem Solving

19980015175 Royal Inst. of Tech., Div. of Optimization and Systems Theory, Stockholm, Sweden

Well-Posedness of the Rational Covariance Extension Problem: Optimization and Systems Theory

Byrnes, C. I., Royal Inst. of Tech., Sweden; Landau, H. J., Royal Inst. of Tech., Sweden; Lindquist, A., Royal Inst. of Tech., Sweden; 1996; 22p; In English

Report No.(s): PB97-209043; TRITA/MAT-96-OS5; KTH/OPT SYST/FR-96/5 SE; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this paper, the authors give a new proof of the solution of the rational covariance extension problem, an interpolation problem with historical roots in potential theory, and with recent application in speech synthesis, spectral estimation, stochastic systems theory, and systems identification. The heart of this problem is to parameterize, in useful systems theoretical terms, all rational,

(strictly) positive real functions having a specified window of Laurent coefficients and a bounded degree. After giving an historical motivation and a survey of the rational covariance extension problem, the authors give a proof that the rational covariance extension problem is well-posed in the sense of Hadamard, i.e. a proof of existence, uniqueness and continuity of solutions with respect to the problem data. The paper concludes with a discussion of open problems.

NTIS

Covariance; Optimization; Rational Functions

19980015204 Army Research Lab., Corporate Information and Computing Center, Aberdeen Proving Ground, MD USA

ARL Zonal Navier-Stokes Solvers, CHSSI CFD-6 Project Annual Report, 1 Apr. - 30 Sep. 1996

Collins, James P., Army Research Lab., USA; Pressel, Daniel M., Army Research Lab., USA; Nietubicz, Charles J., Army Research Lab., USA; Sahu, Jubaraj, Army Research Lab., USA; Aug. 1997; 44p; In English

Report No.(s): AD-A331111; ARL-MR-364; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The goal of the common High-Performance Computing (HPC) Software Support initiative (CHSSI) Computational Fluid Dynamics (CFD)-6 is to develop scalable versions of two Army Navier-Stokes solvers that can efficiently utilize the Department of Defense's (DOD) HPC resources. At the completion of this project, these codes will be made available to the DOD Research, Development, Test, and Engineering (RDT&E) community for analysis and design of weapons systems. This report documents the first 6 months of this effort.

DTIC

Computational Fluid Dynamics; Navier-Stokes Equation; Weapon Systems

19980015382 Royal Inst. of Tech., Stockholm, Sweden

L(sup 2)-Estimate for the Solution to the Time Dependent Schroedinger Equation

Walther, B. G., Royal Inst. of Tech., Sweden; May 1996; 11p; In English; Figures in this document may not be legible in microfiche Report No.(s): PB97-100820; TRITA-MAT-96-MA-15; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

For $\xi(\epsilon)R(\sup n)$, $t(\epsilon)R$ and $f(\epsilon)R(\sup n)$ define $(Sf)(t)(\sup -)(\xi) = \exp(it)$ absolute value of $\xi(\sup 2)\bar{b}f(\epsilon)$. We determine the optimal regularity so such that $\int_{R(\sup n)} (double vertical line(Sf)(x) double vertical line)(\sup 2)(\sub L(\sup 2)(R)dx/(1+absolute value of x)(\exp 2) less than or equal to C (double vertical line f double vertical line)(\exp 2)(\sub H(\sup s)((R(\sup n)), s greater than s(\sub 0) holds where C is independent of $f(\epsilon)S(R(\sup n))$ or we show optimal regularity does not exist. This problem has been treated before by Vega and Wang. Our theorem can be generalized to the case where the $\exp(it)$ absolute value of $\epsilon(\sup -)$ is replaced by $\exp(it)$ absolute value of $\epsilon a(\sup a)$, a not equal 2. The proof uses Plancherel's theorem on R , orthogonality arguments arising from decomposing $L(\sup 2)(R(\sup n))$ using spherical harmonics and a uniform estimate for Bessel functions. Homogeneity arguments are used to show that results are sharp with respect to regularity.$

NTIS

Bessel Functions; Decomposition; Homogeneity; Orthogonality; Schroedinger Equation

19980015440 Royal Inst. of Tech., Dept. of Mathematics, Stockholm, Sweden

Partial Stochastic Realization Problem: Optimization and Systems Theory

Byrnes, C. I., Royal Inst. of Tech., Sweden; Lindquist, A., Washington Univ., USA; 1996; 47p; In English; Sponsored in part by Southwestern Bell Foundation

Report No.(s): PB96-173273; TRITA/MAT-95/OS-5; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this paper we describe a complete parameterization of the solution to the partial stochastic realization problem in terms of a nonstandard matrix Riccati equation. Our analysis of this Covariance Extension Equation is based on a recent complete parameterization of all strictly positive real solutions to the rational covariance extension problem, answering a conjecture due to Georgiou in the affirmative. We also compute the dimension of partial stochastic realizations in terms of the rank of the unique positive semi-definite solution to the Covariance Extension Equation, yielding some insights into the structure of solutions to the minimal partial stochastic realization problem. by combining this parameterization with some of the classical approaches in partial concerning the degrees of minimal stochastic partial realizations. As a corollary to these results, we note that, in sharp contrast with the deterministic case, there is no generic value of the degree of a minimal stochastic realization of partial covariance sequence of fixed length.

NTIS

Stochastic Processes; Riccati Equation; Differential Equations

19980015615 Minnesota Univ., Dept. of Electrical and Computer Engineering, Minneapolis, MN USA

Structure and Geometry in Partial Differential Equations for Image Processing and Analysis *Annual Report, May - Oct. 1997*

Sapiro, Guillermo, Minnesota Univ., USA; Oct. 20, 1997; 29p; In English

Contract(s)/Grant(s): N00014-97-I-0509

Report No.(s): AD-A330540; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We first describe results on shape-based image contrast enhancement. This work shows how to perform local contrast enhancement while preserving the shapes in the image. We have transferred this software to Dr. Szymczak from Physical Acoustics at the Naval Research Laboratory for testing on underwater laser images (LIDAR). We then show a novel approach to anisotropic diffusion. This approach is based on robust statistics, and in particular, in the theory of influence functions. This technique is, for example, of particular significance for image denoising prior to segmentation. We conclude this document with a description of a novel technique of incorporating prior information in anisotropic diffusion. The idea is to use Bayes rule to compute posterior distributions, and then, regularize those distributions via partial differential equations before the MAP is computed. Although a number of results have already been obtained in these areas, the work described in this document is still in progress. As was mentioned above, we want to extend the work on shape-preserving contrast enhancement to include additional definitions of shape and adapt it to specific applications. We are also planning to extend the robust framework for anisotropic diffusion to vector-valued data, and investigate fast implementations. We plan to further investigate the underlying theory of the posterior diffusion work, and to apply it to additional problems. The work described in this document opens a number of theoretical questions that we plan to address as well.

DTIC

Acoustics; Anisotropy; Bayes Theorem; Image Analysis; Image Contrast; Image Processing; Imaging Techniques; Partial Differential Equations; Optical Radar

19980015649 Institute for Computer Applications in Science and Engineering, Hampton, VA USA

A Trust Region Framework for Managing the Use of Approximation Models in Optimization

Alexandrov, Natalia, NASA Lewis Research Center, USA; Lewis, Robert M., Institute for Computer Applications in Science and Engineering, USA; Torczon, Virginia, College of William and Mary, USA; Dennis, J. E., Jr., Rice Univ., USA; Oct. 1997; 15p; In English

Contract(s)/Grant(s): NAS1-97046; NAS1-19480; F496020-95-I-0210

Report No.(s): AD-A330534; NASA-CR-201745; NAS 1.26:201745; ICASE-97-50; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper presents an analytically robust, globally convergent approach to managing the use of approximation models of various fidelity in optimization. By robust global behavior we mean the mathematical assurance that the iterates produced by the optimization algorithm, started at an arbitrary initial iterate, will converge to a stationary point or local optimizer for the original problem. The approach we present is based on the trust region idea from nonlinear programming and is shown to be provably convergent to a solution of the original high-fidelity problem. The proposed method for managing approximations in engineering optimization suggests ways to decide when the fidelity, and thus the cost of the approximations might be fruitfully increased or decreased in the course of the optimization iterations. The approach is quite general. We make no assumptions on the structure of the original problem, in particular, no assumptions of convexity and separability, and place only mild requirements on the approximations. The approximations used in the framework can be of any nature appropriate to an application; for instance, they can be represented by analyses, simulations, or simple algebraic models. This paper introduces the approach and outlines the convergence analysis.

DTIC

Nonlinear Programming; Simulation; Convergence

19980015737 Technische Univ., Dept. of Mathematics and Computing Science, Eindhoven, Netherlands

Approximate Cyclic Reduction Preconditioning

Reusken, A. A., Technische Univ., Netherlands; Feb. 1997; 23p; In English

Report No.(s): PB97-204705; RANA-97-02; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We discuss an iterative method for solving large sparse systems of equations. A hybrid method is introduced which uses ideas both from ILU preconditioning and from multigrid. The resulting preconditioning technique requires the matrix only. A multilevel structure is obtained by using maximal independent sets for graph coarsening. Ideas from PB96-199872 and PB95-197091 are

used to construct a sparse Schur complement approximation. The resulting preconditioner has a transparent modular structure similar to the algorithmic structure of a multigrid V-cycle.

NTIS

Algorithms; Multigrid Methods; Preconditioning; Independent Variables; Computational Grids; Partial Differential Equations; Iterative Solution

19980015801 New York Univ., Courant Inst. of Mathematical Sciences, New York, NY USA

Estimation with Best Bases Final Report, 30 Sep. 1996 - 29 Sep. 1997

Mallat, Stephane, New York Univ., USA; Geiger, David, New York Univ., USA; Sep. 15, 1997; 9p; In English

Contract(s)/Grant(s): F49620-96-I-0455

Report No.(s): AD-A330530; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

New models of non-stationary processes have been introduced. We showed that the covariance of locally stationary processes can be modeled as pseudodifferential operators. The spectrum of such processes is estimated by approximating the Karhunen-Loeve basis with a local cosine basis, that is optimized with a best basis search algorithm. Applications to geophysics have been studied. Locally dilated processes are a different kind of non-stationary processes that appear in image processing and in physical phenomena that involve Doppler effects. It was shown that the dilation parameters of such processes can be estimated with a wavelet transform, through the solution of a partial differential equation in the scale-space plane. An application concerns the reconstruction of three dimensional surfaces from texture gradient in images. The last part of this project was devoted to the analysis of the distortion-rate function of wavelet image transform codes. By modeling images as element of Besov spaces, we calculated precise analytical formula of distortion-rates, which are verified by numerical experiments.

DTIC

Karhunen-Loeve Expansion; Operators (Mathematics); Partial Differential Equations; Aerospace Planes; Algorithms; Covariance; Distortion; Estimating; Geophysics

19980016632 Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette, France

Thom-Type Construction for Maps with Singularities

Rimanyi, R., Institut des Hautes Etudes Scientifiques, France; Jan. 1997; 27p; In English

Report No.(s): PB97-140396; IHES/M/97/06; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Thom-type constructions will be given for stable maps of positive codimension. The key step of the construction is the study of the symmetry group of stable singularities. Some differential topological applications are also presented.

NTIS

Maps; Singularity (Mathematics)

19980016749 Groningen Rijksuniv., Dept. of Mathematics, Netherlands

Etale Cohomology of Rigid Analytic Spaces

deJong, J., Groningen Rijksuniv., Netherlands; vander Put, M., Groningen Rijksuniv., Netherlands; 1995; 65p; In English

Report No.(s): PB96-132568; W-9506; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The origin of this paper lies in the question on etale cohomology for rigid analytic spaces posed in (S-S). In that paper the etale site and a corresponding cohomology theory for analytic varieties are defined. We prove here that the axioms for an abstract cohomology (as stated in (S-S)) hold for this cohomology theory. In addition, we prove a (quasi-compact) base change theorem for rigid etale cohomology and a comparison theorem comparing rigid and algebraic etale cohomology of algebraic varieties. The main tools in this paper are analytic (resp. etale) points and rigid (resp. etale) overconvergent sheaves. The rigid overconvergent sheaves on affinoids were first introduced in (P82) and were called constructible in that paper. They were further studied in (S93) and were called conservative there. The term 'overconvergent', also used by P. Berthelot in recent work, seemed more appropriate this time.

NTIS

Algebra; Homology; Axioms

19980016817 Groningen Rijksuniv., Dept. of Mathematics, Netherlands

Bifurcations at infinity in a Model for 1:4 Resonance

Krauskopf, B., Groningen Rijksuniv., Netherlands; 1995; 51p; In English

Report No.(s): PB96-132550; W-9502; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The 1:4 resonance problem is briefly introduced. See (Krauskopf 1995) for a detailed introduction. The Poincare map of a closed orbit near 1:q resonance can be approximated up to any prescribed order by the time-one map of a $Z(\text{sub } q)$ -equivariant

planar vector field composed with the rotation by $2(\pi)/q$. The authors are concerned with the remaining problem of finding all unfoldings of $Z \text{ sub } q$ -equivariant planar vector fields for q does not equal 4 are known, which provides an answer for all resonances, except for the case of 1:4 resonance.

NTIS

Branching (Mathematics); Resonance

19980016819 Groningen Rijksuniv., Dept. of Mathematics, Netherlands

Vector Valued Integration with Applications to the Operator Valued $H(\text{sub infinity})$ Space

Thomas, E. G. F., Groningen Rijksuniv., Netherlands; 1995; 39p; In English

Report No.(s): PB96-132527; W-9413; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We show that the notion of strongly integrable operator valued function is appropriate for the description of translation invariant operators in spaces of vector valued functions and in connection with the operator valued analogue of the classical $H(\text{sub infinity})$ space. The paper is expository. Contents: Introduction; Bochner's integral; The theorems of Lusin and Egoroff; Vector integration of a more general kind; Operator valued functions; Translation invariant operators; Causal operators, The space $H(\text{sub infinity})$; Example; Proofs; The case of non separable Hilbert spaces; References.

NTIS

Algorithms; Analogs; Operators (Mathematics)

19980016835 Carnegie-Mellon Univ., Dept. of Computer Science, Pittsburgh, PA USA

Combining Multiple Optimization Runs with Optimal Dependency Trees

Davies, Scott, Carnegie-Mellon Univ., USA; Baluja, Shumeet, Justsystem Pittsburgh Research Center, USA; Jun. 30, 1997; 14p; In English

Report No.(s): AD-A329937; CMU-CS-97-157; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

When trying to solve a combinatorial optimization problem, often multiple algorithms and/or multiple runs of the same algorithm are used in order to find multiple local minima. The information gained from previous search runs is commonly discarded when selecting initialization points for future runs. We present a method which uses information from previous runs to determine promising starting points for future searches. Our algorithm, termed COMIT, models inter-parameter dependencies present in the previously found high-evaluation solutions. COMIT incrementally learns optimal dependency trees that model the pairwise dependencies in a set of good solutions found in previous searches. COMIT then samples the probability distributions modeled by these trees to generate new starting points for future searches. This algorithm has been successfully applied to jobshop scheduling, traveling salesman, knapsack, rectangle packing, and bin-packing problems.

DTIC

Heuristic Methods; Optimization; Probability Theory

65

STATISTICS AND PROBABILITY

Includes data sampling and smoothing: Monte Carlo method; and stochastic processes.

19980012527 Leiden Univ., Dept. of Mathematics and Computer Science, Netherlands

Optimal Control in Light Traffic Markov Decision Processes

Koole, G., Institut National de Recherche d'Informatique et d'Automatique, France; Passchier, O., Leiden Univ., Netherlands; Nov. 14, 1995; 14p; In English

Report No.(s): PB96-174412; TW-95-12; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We consider Markov Decision Processes under light traffic conditions. We develop an algorithm to obtain asymptotically optimal policies for both the total discounted and the average reward criterion. This gives a general framework for several light traffic results in the literature. We illustrate the method by deriving the asymptotically optimal control of a simple ATM network.

NTIS

Asynchronous Transfer Mode; Policies; Traffic

19980012611 Royal Inst. of Tech., Dept. of Mathematics, Stockholm, Sweden

Canonical Correlation Analysis, Approximate Covariance Extension, and Identification of Stationary Time Series

Lindquist, A., Royal Inst. of Tech., Sweden; Picci, G., Padua Univ., Italy; Apr. 1995; 46p; In English

Report No.(s): PB96-173299; TRITA/MAT-95/OS-3; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this paper we analyze a class of state-space identification algorithms for time-series, based on canonical correlation analysis, in the light of recent results on stochastic systems theory. In principle, these so called 'subspace methods' can be described as covariance estimation followed by stochastic realization. In this paper the statistical problem of stochastic modeling from estimated covariances is phrased in the geometric language of stochastic realization theory. We review the basic ideas of stochastic realization theory in the context of identification, discuss the concept of stochastic balancing and of stochastic model reduction by principal subsystem truncation.

NTIS

Stochastic Processes; Mathematical Models; Statistical Analysis; Time Series Analysis

19980014560 Institute of Nuclear Chemistry and Technology, Warsaw, Poland

Smoothing X-ray spectra with regression splines and fast Fourier transform *Wygladzanie widm promieniowania X metodami regresyjnych funkcji sklepanych i szybkiej transformaty Fouriera*

Antoniak, Waldemar, Institute of Nuclear Chemistry and Technology, Poland; Urbanski, Piotr, Institute of Nuclear Chemistry and Technology, Poland; 1996; ISSN 1425-7351; 22p; In Polish

Report No.(s): INCT-12/B/96; DE97-621488; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Regression splines and Fast Fourier Transform (FFT) methods were used for smoothing the X-ray spectra obtained from the proportional counters. The programs for computation and optimization of the smoothed spectra were written in MATLAB languages. It was shown, that application of the smoothed spectra in the multivariate calibration can result in a considerable reduction of measurement errors.

DOE

Fast Fourier Transformations; X Ray Fluorescence; X Ray Analysis; Spectra

19980015652 Naval Undersea Warfare Center, Newport, RI USA

Evaluation of Small Tail Probabilities Directly from the Characteristic Function *Progress Report*

Nuttall, Albert H., Naval Undersea Warfare Center, USA; Sep. 15, 1997; 53p; In English

Report No.(s): AD-A330541; NUWC-NPT-TR-10840; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

An efficient, fast, and accurate Fourier transform technique for obtaining small tail probabilities for both the probability density function and the exceedance distribution function, directly from the characteristic function, is derived and demonstrated numerically for several examples. The method is especially useful when analytic or asymptotic expressions for the probabilities are unavailable or unknown. By choosing the shift parameter r close to the highest singularity of the characteristic function in the complex plane, very small values of the tail probabilities of the density function and exceedance distribution function can be realized. The cost in this approach is that the sampling increment must then be taken small, in order to avoid aliasing. Finer sampling necessitates more computer time and effort, but it does not require more storage; rather, prealiasing can be advantageously employed to keep the fast Fourier transform size at reasonable values. The fast Fourier transform size has no effect upon the errors caused by aliasing and truncation; rather, the size merely controls the spacing at which the probability density function and exceedance distribution function outputs are calculated. Tail probabilities in the E-50 range are readily available with a computer limited to 15 significant decimal digits.

DTIC

Density Distribution; Distribution Functions; Fourier Transformation; Probability Theory; Series Expansion; Asymptotic Series

66

SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

19980014523 RAND Corp., Research Inst., Santa Monica, CA USA

Should C-17s Be Used to Carry In-Theater Cargo During Major Deployments?

Killingsworth, Paul S.; Melody, Laura; Jan. 1997; 54p; In English

Contract(s)/Grant(s): F49642-96-C-0001; DASW01-95-C-0059

Report No.(s): AD-A331827; RAND-DB-171-AF/OSD; ISBN 0-3330-2545; Copyright Waived; Avail: CASI; A04, Hardcopy; A01, Microfiche

Past analyses of the roles and missions of the C-17 have centered chiefly on its effectiveness in moving military equipment over intercontinental distances, i.e., as a strategic airlifter. In contrast, the C-17 Tactical Utility Analysis (TUA) provided an in-theater perspective on C-17 operations. RAND had two objectives in its support of the TUA: one to estimate the capacity of airfields

to support air mobility operations and the other to evaluate possible concepts of operation for in-theater C-17 operations. The first objective is addressed in James P. Stucker, Ruth T. Berg, et al., Understanding Airfield Capacity for Airlift Operations, Santa Monica, CA: RAND, MR-700-AF/OSD (forthcoming). This Documented Briefing addresses the second objective.

DTIC

Transport Aircraft; C-17 Aircraft; Effectiveness; Air Transportation

19980015186 Consiglio Nazionale delle Ricerche, Ist. di Analisi dei Sistemi ed Informatica, Rome, Italy

Nonmonotone Curvilinear Stabilization Techniques for Unconstrained Optimization

Ferris, M. C., Consiglio Nazionale delle Ricerche, Italy; Lucidi, S., Consiglio Nazionale delle Ricerche, Italy; Roma, M., Consiglio Nazionale delle Ricerche, Italy; Sep. 1994; 19p; In English

Report No.(s): PB96-153358; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The authors present a new algorithmic framework for solving unconstrained minimization problems that incorporates a curvilinear linesearch. The search direction used in the authors framework is a combination of an approximate Newton direction and a direction of negative curvature. Global convergence to a stationary point where the Hessian matrix is positive semidefinite is exhibited for this class of algorithms by means of a nonmonotone stabilization strategy. An implementation using the Bunch-Parlett decomposition is shown to outperform several other techniques on a large class of test problems.

NTIS

Algorithms; Functions (Mathematics); Newton Methods; Curvature; Sequential Analysis; Factor Analysis

19980015187 Consiglio Nazionale delle Ricerche, Ist. di Analisi dei Sistemi ed Informatica, Rome, Italy

Exact Algorithm for Project Scheduling with Resource Constraints Based on a New Mathematical Formulation

Bianco, L., Consiglio Nazionale delle Ricerche, Italy; Maniezzo, V., Consiglio Nazionale delle Ricerche, Italy; Mingozzi, A., Consiglio Nazionale delle Ricerche, Italy; Ricciardelli, S., Consiglio Nazionale delle Ricerche, Italy; Feb. 1995; 17p; In English; Sponsored in part by Centro di Ricerca Europeo, Ispra (Italy).

Report No.(s): PB96-153366; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

In this paper we consider the Project Scheduling Problem with resource constraints, where the objective is to minimize the project makespan. We present a new 01-linear programming formulation of the problem that requires an exponential number of variables, corresponding to all feasible subsets of activities that can be simultaneously executed without violating resource of precedence constraints. Different relaxations of the above formulation are used to derive three new lower bounds, which dominate the value of the longest path on the precedence graph and are tighter than the bound proposed by Stinson et al. (1978). A tree search algorithms based on the above formulation, that uses lower bounds and dominance criteria is also presented. Computational results indicate that the exact algorithm can solve hard instances that cannot be solved by the best algorithms reported in the literature.

NTIS

Algorithms; Scheduling; Project Management

19980016585 CAE Electronics G.m.b.H., Stolberg, Germany

Advances in Full Mission Environment Simulation Technology

Fuss, Norbert, CAE Electronics G.m.b.H., Germany; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 8p; In English; Also announced as 19980016571; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

The significant advances in the field of simulation technology allow a more and more realistic reproduction of a weapon system's tactical environment. On the other hand, modern weapon systems place increasingly high demands on the quality and complexity of training equipment. In particular, such weapon system can no longer be regarded as autonomous, individual components. Rather, they have become an element of a complex military structure fulfilling operation-specific tasks. This leads to the conclusion that the design of training equipment should not only be system-specific but also operations-specific. The technologies which have been developed over the last years, especially in the fields of tactical simulation, computer-generated forces (CGFs) and networking, now enable the flexibility which is mandatory for structuring such a training system. The technological basis required for creating such a system will be discussed in this paper on the example of a Complex Air-Warfare Demonstrator, which has been developed under a European study contract.

Author

Military Operations; Weapon Systems; Warfare; Systems Simulation; Education; Computerized Simulation; Training Devices

19980016586 Cambridge Research Associates, McLean, VA USA

Virtual Environments: Visualization Throughout the Combat Mission

Adagio, Floyd, Cambridge Research Associates, USA; Babiak, Nicholas, Cambridge Research Associates, USA; Bollinger, Kenneth, Defense Micro-Electronic Activity, USA; Caposell, Charles, Naval Air Systems Command, USA; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 6p; In English; Also announced as 19980016571; Original contains color illustrations; Copyright Waived; Avail: CASI; A02, Hardcopy; A02, Microfiche

All levels of the military command structure, from senior military commanders to the forward combatant require visualization of data and fusion of tactical and strategic information. Specifically, visually oriented displays provide intuitive, readily understandable information that can be easily interpreted and acted upon. Visual systems provide a variety of data and information including maps, terrain elevation, imagery, iconics, symbology, and text. The effective use of military information in a combat situation should be specific to the individual mission, yet be consistent with all other levels of the military command structure. Consistency among and between command levels is critical to support coordinated planning, execution, and after-action activities. This manuscript and associated presentation provide a discussion of the application of virtual visualization environments within a hierarchical requirements structure, based on warfighting functional requirements. Additionally, this presentation relates functional requirements to system characteristics and discusses utility of the information to airborne applications.

Author

Military Operations; Airborne Equipment; Multisensor Fusion; Imagery; Communication; Information Systems; Virtual Reality

67

THEORETICAL MATHEMATICS

Includes topology and number theory.

19980015628 Institut des Hautes Etudes Scientifiques, Paris, France

Straight Chern Character for Witt Spaces

Moscovici, H., Institut des Hautes Etudes Scientifiques, France; Wu, F., Institut des Hautes Etudes Scientifiques, France; Mar. 1996; 19p; In English

Report No.(s): PB96-186457; IHES/M/96/21; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The authors show that the Goresky-MacPherson homology L-class of a Witt space X can be represented, in a local fashion, as the 'straight' Chern character of the Cheeger signature K-cycle constructed out of any piecewise Riemann metric of conic type on X.

NTIS

Operators (Mathematics); Analysis (Mathematics); Riemann Manifold

19980015739 Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette, France

Conformal Distortion and Sullivan's Sector Theorem

Defaria, E., Institut des Hautes Etudes Scientifiques, France; Mar. 20, 1996; 11p; In English

Report No.(s): PB96-186440; IHES/M/96/20; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Using general bounds on the conformal distortion of univalent maps, the authors prove a strong version of Sullivan's sector theorem, which gives certain sufficient conditions for an arbitrarily long composition of univalent Herglotz functions to map the upper half-plane into a proper sub-sector.

NTIS

Nonlinearity; Conformal Mapping

19980016686 National Inst. of Standards and Technology, Applied and Computational Mathematics Div., Gaithersburg, MD USA

Notion of a xi-Vector and a Stress Tensor for a General Class of Anisotropic Diffuse Interface Models

Wheeler, A. A., National Inst. of Standards and Technology, USA; McFadden, G. B., National Inst. of Standards and Technology, USA; Apr. 1996; 29p; In English

Report No.(s): PB96-193776; NISTIR-5848; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The authors consider a general class of multiple-order-parameter models which represent the diffuse interface of a first-order phase transition with anisotropic surface energy and kinetics. They show that in the sharp interface limit, it is possible to construct a xi-vector and they derive the three-dimensional form of the Gibbs-Thomson equation. Moreover they develop the notion of a stress tensor for diffuse interface theories and show that it may be used to derive the equilibrium conditions for edges in interfaces

as well as multiple functions. The authors also show that when edges form in the special case of a phase-field model, a weak shock forms in which the spatial derivatives of the phase field are not continuous, and they derive the jump conditions.

NTIS

Surface Diffusion; Stress Tensors; Anisotropy

19980016753 Naval Postgraduate School, Monterey, CA USA

Prediction and Geometry of Chaotic Time Series

Leonardi, Mary L., Naval Postgraduate School, USA; Jun. 1997; 117p; In English

Report No.(s): AD-A333449; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This thesis examines the topic of chaotic time series. An overview of chaos, dynamical systems, and traditional approaches to time series analysis is provided, followed by an examination of state space reconstruction. State space reconstruction is a nonlinear, deterministic approach whose goal is to use the immediate past behavior of the time series to reconstruct the current state of the system. The choice of delay parameter and embedding dimension are crucial to this reconstruction. Once the state space has been properly reconstructed, one can address the issue of whether apparently random data has come from a low-dimensional, chaotic (deterministic) source or from a random process. Specific techniques for making this determination include attractor reconstruction, estimation of fractal dimension and Lyapunov exponents, and short-term prediction. If the time series data appears to be from a low-dimensional chaotic source, then one can predict the continuation of the data in the short term. This is the inverse problem of dynamical systems. In this thesis, the technique of local fitting is used to accomplish the prediction. Finally, the issue of noisy data is treated, with the purpose of highlighting where further research may be beneficial.

DTIC

Time Series Analysis; Chaos; Dynamical Systems; Random Processes; Nonlinearity

70

PHYSICS (GENERAL)

For precision time and time interval (PTTI) see 35 Instrumentation and Photography; for geophysics, astrophysics or solar physics see 46 Geophysics, 90 Astrophysics, or 92 Solar Physics.

19980015634 Tashkent V. I. Lenin State Univ., USSR

Abstracts of the InterNational Conference on Actual Problems of Physics of Semiconductor Devices *Sbornik Trudov Mezhdunarodnoj Konferentsii 'Aktual'nye Problemy Fiziki Poluprovodnikovyx Priborov'*

Apr. 1997; 131p; In Russian; InterNational Conference on Actual Problems of Physics of Semiconductor Devices, 24-26 Apr. 1997, Tashkent, Uzbekistan

Report No.(s): INIS-UZ-039; CONF-9704109; DE97-627376; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)); US Sales Only; Abstracts Only, Microfiche

InterNational Conference on actual problems of physics of semiconductor devices was held on 24-26 April, 1997 in Tashkent, Uzbekistan. The specialists discussed various aspects of problems of semiconductor materials and devices and their applications in the fields of industry, science and technology. More than 100 talks were presented in the in the meeting and some of them have application to nuclear science. (A.A.D.).

DOE

Research and Development; Semiconductor Devices; Semiconductors (Materials)

71

ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see 45 Environmental Pollution.

19980013648 NERAC, Inc., Tolland, CT USA

Architectural Acoustics. (Latest citations from the INSPEC Database)

Jan. 1996; In English

Report No.(s): PB96-859699; Copyright Waived; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning architectural acoustics and the improvements in acoustical insulating materials for the reduction of noise in office spaces, private dwellings, and industrial manufacturing plants. Topics include noise control

in open-plan offices, impact noise through floors, sound isolation between dwellings, and sound insulation of windows. Testing and evaluations of a variety of acoustical insulating building materials are presented. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Acoustics; Insulation

19980014210 Naval Postgraduate School, Monterey, CA USA

A Simulation Study of Acoustic Variability Due to Internal Solitary Waves on the Mid-Atlantic Continental Shelf

Ng, Seng-Leong, Naval Postgraduate School, USA; Mar. 1997; 45p; In English

Report No.(s): AD-A331078; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

During the summer of 1995, a multi-institutional field study called Shallow-Water Acoustic Random Medium (SWARM) was conducted in the Mid-Atlantic Bight continental shelf region off the coast of New Jersey. Environmental and acoustic sensors were deployed as part of SWARM to measure and characterize the internal waves and their impact on the spatial and temporal coherence of the acoustic transmissions. As part of the environmental monitoring network, two bottom-moored, upward-looking acoustic Doppler current profilers (ADCPs) were deployed. Large-amplitude, non-linear, internal soliton wave packets were observed to propagate shoreward from the shelfbreak. Based on the ADCP observations, a kinematic model of the soliton wave packets was developed to synthesize the corresponding temporal and spatial fluctuations in the sound-speed field. Using a coupled normal-mode sound propagation model and the synthesized sound speed variations, the variability of sound pressure and of the modal amplitudes for a 224 Hz CW transmission were simulated. The auto and cross-correlations of sound pressure at different depths, and of the modal amplitudes at a fixed range, were computed in an effort to estimate the vertical and temporal scales of the fluctuating sound field. The simulation method, the simulated acoustic variability as well as the results of the correlation analysis are presented and discussed in this report.

DTIC

Acoustic Velocity; Acoustics; Autocorrelation; Bays (Topographic Features); Continental Shelves; Continuous Radiation; Correlation; Coupled Modes; Cross Correlation; Environmental Monitoring; Internal Waves; Mooring; Nonlinearity

19980014527 NERAC, Inc., Tolland, CT USA

Noise Induced Hearing Impairment and Loss. (Latest citations from Pollution Abstracts)

Apr. 1996; In English; Page count unavailable.

Report No.(s): PB96-868120; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning environmentally induced acoustic trauma. Occupational, residential, aircraft-related, and automotive noise stress are examined. Articles discuss noise control and reduction, diagnosis and pathology of hearing loss, regulation and legislation regarding noise pollution, personal protection, therapy, and risk assessment. Also included are related factors such as sound levels, sound frequencies, and exposure times. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Noise Pollution; Bibliographies; Auditory Defects

19980016086 NERAC, Inc., Tolland, CT USA

Sonoluminescence: Bubble Dynamics. (Latest Citations from the INSPEC Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864301; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning sonoluminescence, the generation of visible light from vibrating gas bubbles trapped in a liquid medium. The driving force for sonoluminescence is sound waves which cause the trapped bubbles to vibrate. Citations focus on the physics of sonoluminescence and bubble dynamics including cavitation, ultrasonics, hydrodynamics, and materials. Applications for clinical ultrasound are also discussed.

NTIS

Bibliographies; Sonoluminescence; Visible Spectrum; Sound Waves; Bubbles; Light (Visible Radiation)

19980016137 Naval Undersea Warfare Center, New London, CT USA

Near-Optimum Detection Performance of Power-Law Processors for Random Signals of Unknown Locations, Structure, Extent, and Arbitrary Strengths *Progress Report*

Nuttall, A. H., Naval Undersea Warfare Center, USA; Apr. 15, 1996; 165p; In English

Report No.(s): PB96-181235; NUWC-NPT-TR-11123; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

This technical report is the fifth in a series of NUWC Division Newport publications which are aimed at determining the fundamental performance capability of detection of random signals with unknown characteristics. The previous four reports dealt mainly with the case of equal average signal power levels in all the occupied bins; this report extends those investigation by addressing the important case of arbitrary (unequal) signal powers in the occupied bins. The major questions to be answered is, whether the same power-law processor values of the power v should be used in order to reach performance levels in the neighborhood of those for the optimum processor. Also, the exact losses of the power-law class of processors, for various numbers of occupied bins and different sets of signal strengths, are of interest. The principal motive is the need to detect intermittent signals that occur in random locations with no apparent structure and with arbitrary strengths, time intervals, and/or frequency extents.

NTIS

Signal Processing; Underwater Acoustics; Detection; Sound Detecting and Ranging; Performance Prediction; Central Processing Units

19980016842 National Aerospace Lab., Amsterdam, Netherlands

Effects of Asymmetric Inflow on Near-Field Propeller Noise

Schulten, J. B. H. M., National Aerospace Lab., Netherlands; 1997; 17p; In English; 1st; Aeroacoustic Conference, 12-15 Jun. 1995, Munich, Germany

Report No.(s): PB97-178826; NLR-TP-95136-U; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The interior noise of jet aircraft can compete with luxury cars. Propeller driven aircraft, however, generally suffer from an unpleasantly loud cabin noise. The aerodynamic and acoustic effects of non-axial inflow on wide-chord, advanced high speed propellers are studied by means of a lifting surface theory. Starting from the flow equations for a perturbed, axially subsonic flow, expressions are derived for the pressure and velocity field of a propeller. by using a Green's function representation in separated, cylindrical coordinates the boundary condition at the hub is naturally incorporated.

NTIS

Aerodynamic Characteristics; Aerodynamic Coefficients; Aerodynamic Noise; Subsonic Flow; Asymmetry; Jet Aircraft; Propeller Noise

72

ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure, electron properties, and molecular spectra.

19980012539 National Lab. for High Energy Physics, Tsukuba, Japan

TREPS: a Monte-Carlo event generator for two-photon processes at $e^{+}e^{-}$ colliders using an equivalent photon approximation

Uehara, Sadaharu, National Lab. for High Energy Physics, Japan; Jul. 1996; 14p; In English

Report No.(s): KEK-96-11; DE97-745399; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A description and the use of an event-generator code for two-photon processes at $e^{+}e^{-}$ colliders, TREPS, are presented. This program uses an equivalent photon approximation in which the virtuality of photons is taken into account. It is applicable to various processes by specifying a combination of final-state particles and the angular distributions among them. A comparison of the results with those from other programs is also given.

DOE

Monte Carlo Method; Elementary Particle Interactions; Positrons; Particle Production

19980013666 Tokyo Univ., Inst. for Nuclear Study, Japan

Hyperfine structure of the metastable $p\text{-}\bar{\text{He}}^{+}$ atom revealed by a laser-induced $(n,l) = (37,35)$ (yields) $(38,34)$ transition

Widmann, E., European Organization for Nuclear Research, Switzerland; Eades, J., European Organization for Nuclear Research, Switzerland; Yamazaki, T., European Organization for Nuclear Research, Switzerland; Torii, H. A., Tokyo Univ., Japan; Hayano, R. S., Tokyo Univ., Japan; Hori, M., Tokyo Univ., Japan; Ishikawa, T., Tokyo Univ., Japan; Kumakura, M., Institute for Molecular Science, Japan; Morita, N., Institute for Molecular Science, Japan; Sugai, I., Tokyo Univ., Japan; Hartmann, F. J., Technische

Univ., Germany; vonEgidy, T., Technische Univ., Germany; Ketzer, B., Technische Univ., Germany; Maierl, C., Technische Univ., Germany; Pohl, R., Technische Univ., Germany; Horvath, D., Hungarian Academy of Sciences, Hungary; Nov. 1996; 5p; In English; Sponsored in part by Hungarian National Science Foundation.

Report No.(s): INS-1175; DE97-745400; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

A precise scan of the previously discovered laser-induced transition $(n,l) = (37,35)$ yields $(38,34)$ in $p\text{-bar He}(+)$ revealed a doublet structure with a separation of $(\Delta E)_{\text{HF}} = 1.70 (+/-) 0.05$ GHz. This new type of 'hyperfine' splitting is ascribed to the interaction of the antiproton orbital angular momentum and the electron spin.

DOE

Scanners; Hyperfine Structure; Metastable Atoms; Angular Momentum

19980014453 Japan Atomic Energy Research Inst., Dept. of Fusion Plasma Research, Tokyo, Japan

The design study of the JT-60SU device, No. 6, The Neutral Beam Injection System of JT-60SU

Kuriyama, Masaaki, Japan Atomic Energy Research Inst., Japan; Ushigusa, Kenkichi, Japan Atomic Energy Research Inst., Japan; Itou, Takao, Japan Atomic Energy Research Inst., Japan; Yamamoto, Masahiro, Japan Atomic Energy Research Inst., Japan; Yamazaki, TaKeshi, Japan Atomic Energy Research Inst., Japan; Sato, Fujio, Japan Atomic Energy Research Inst., Japan; Kitai, Tatsuya, Japan Atomic Energy Research Inst., Japan; Mori, Katsuharu, Japan Atomic Energy Research Inst., Japan; Kikuchi, Mitsuru, Japan Atomic Energy Research Inst., Japan; Nagami, Masayuki, Japan Atomic Energy Research Inst., Japan; Feb. 1997; 140p; In Japanese

Report No.(s): JAERI-Research-97-005; DE97-750676; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The design study of the neutral beam injection system for JT-60SU device has been progressed. The JT-60SU has planned to use three kind of neutral beam systems: 100 keV positive-ion based NBI for plasma diagnostics, 500 keV negative-ion based NBI for initial plasma heating phase, and 750 keV negative-ion based NBI for main plasma heating device. The first two NBIs are modified from present JT-60U NBI systems, and the third one is newly designed and fabricated. The design studies of these NBIs are concentrated the effort to a technical adaptability to the JT-60SU and an exposure of the technical issues in a modification or a NBI have been determined to the JT-60SU without any serious problems. This report describes the conceptual design results of the neutral beam injection system.

DOE

Design Analysis; Neutral Beams; Tokamak Devices

19980014579 Department of the Navy, Washington, DC USA

Direct Molecular Patterning Using a Micro-Stamp Gel

Turner, David C., Inventor, Department of the Navy, USA; Brett, Martin, Inventor, Department of the Navy, USA; Gaber, Bruce P., Inventor, Department of the Navy, USA; Sep. 30, 1997; 34p; In English

Patent Info.: US-Patent-Appl-SN-940178

Report No.(s): AD-D018628; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

A stamp for transferring molecules and molecular patterns to a substrate surface includes a backing and a polymeric gel bound to the backing and loaded with the molecular species. Where the molecule to be patterned is a biomolecule, such as a protein or nucleic acid, the polymeric gel is typically a hydrogel. Exemplary hydrogels include sugar-based polyacrylates and polyacrylamides.

DTIC

Gels; Acrylic Resins; Molecules

19980015173 National Inst. for Fusion Science, Nagoya, Japan

Transport processes and entropy production in toroidally rotating plasmas with electrostatic turbulence

Sugama, H., National Inst. for Fusion Science, Japan; Horton, W., National Inst. for Fusion Science, Japan; Aug. 1996; 42p; In English

Report No.(s): NIFS-435; DE97-736296; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Transport processes and resultant entropy production in magnetically confined plasmas are studied in detail for toroidally rotating systems with electrostatic turbulence. A new gyrokinetic equation is derived for rotating plasmas with large flow velocities on the order of the ion thermal speed. Neoclassical and anomalous transport of particles, energy, and toroidal momentum are systematically formulated from the ensemble-averaged kinetic equation with the gyrokinetic equation. As a conjugate pair of the thermodynamic force and the transport flux, the shear of the toroidal flow, which is caused by the radial electric field shear, and the toroidal viscosity enter both the neoclassical and anomalous entropy production. The interaction between the fluctuations and the sheared toroidal flow is self-consistently described by the gyrokinetic equation containing the flow shear as the thermody-

namic force and by the toroidal momentum balance equation including the anomalous viscosity. Effects of the toroidal flow shear on the toroidal ion temperature gradient driven modes are investigated. Linear and quasilinear analyses of the modes show that the toroidal flow shear decreases the growth rates and reduces the anomalous toroidal viscosity.

DOE

Confinement; Electric Fields; Electrostatics; Energy Transfer; Flow Velocity; Ion Temperature; Kinetic Equations; Plasmas (Physics); Rotating Plasmas; Shear Flow

19980015181 Istituto Nazionale di Fisica Nucleare, Lecce, Italy

A 250 Msps CAMAC data acquisitions system

Palama', G. F., Lecce Univ., Italy; Neve, A. C., Lecce Univ., Italy; Sep. 1995; 7p; In English

Report No.(s): INFN-TC-95-28; DE97-732523; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)) (US Sales Only), Microfiche

A 250 Msps CAMAC-Compatible Data Acquisition System (DAS) is presented. The DAS represents a first approach to the measurement of the number of primary ionization acts for particle identification in gaseous detectors.

DOE

Data Acquisition; Data Systems; Ionization; Gas Detectors

19980015203 Princeton Univ., Dept. of Chemical Engineering, NJ USA

AASERT: Global Optimization and Sensitivity Analysis in Molecular Structure Determination Final Report, 15 Jul. 1994 - 31 Aug. 1997

Floudas, C. A., Princeton Univ., USA; Rabitz, H., Princeton Univ., USA; Oct. 01, 1997; 4p; In English

Contract(s)/Grant(s): F49620-94-I-0389; AF Proj. 3484

Report No.(s): AD-A331264; AFOSR-TR-97-0555; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The AASERT research dealt with: (1) the molecular structure prediction via global optimization methods; (2) the sensitivity analysis; and (3) molecular dynamic simulations. Rigorous global optimization methods were proposed and applied to oligopeptides, and solvated peptides. Molecular dynamics simulations and tools were introduced at the active site of myoglobin under photolytic decarboxylation.

DTIC

Molecular Structure; Optimization; Sensitivity

19980015249 Grand Accelerator National d'Ions Lourds, Caen, France

Sissi at Ganil

Anne, R., Grand Accelerator National d'Ions Lourds, France; 1996; 9p; In English; Emis-13: InterNational Conference on Electromagnetic Isotope Separators and Techniques Related to Their Applications, 23-27 Sep. 1996, Bad Dürkheim, Germany

Report No.(s): GANIL-P-96-28; CONF-960949; DE97-620983; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

In the continuation of secondary beams production studies started in the eighties, GANIL laboratory has been running for two years an efficient device called SISSI, dedicated to the production of exotic beams by projectile fragmentation. It is based on two superconducting solenoids surrounding a thick target. Its magnetic field is as high as 11 T and its nominal angular acceptance around 160 mr. SISSI is located at the CSS2 cyclotron exit that is upstream the selecting alpha spectrometer and all the experiments rooms which can therefore receive secondary beams on any target.

DOE

Beamforming; Beam Waveguides; Superconductivity; Magnetic Fields; Cyclotrons

19980015639 Illinois Univ., Dept. of Materials Science and Engineering, Urbana, IL USA

Molecular Simulations of Ultrathin Perfluoropolyether Films under Shear Final Report, 1 Jul. 1994 - 30 Jun. 1997

Granick, Steve, Illinois Univ., USA; Jun. 30, 1997; 10p; In English

Contract(s)/Grant(s): F49620-94-I-0319; AF Proj. 3484

Report No.(s): AD-A329688; AFOSR-97-0372TR; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

In this project dealing with aqueous films confined between solid surfaces at spacings comparable to the molecules themselves, we succeeded, for the first time, to investigate the effect of deformation frequency and amplitude on the shear dynamics of these films. We also succeeded, for the first time, to observe molecular ordering of aqueous ions at the solid-liquid interface.

These unique experiments not only open new directions in research on liquids in confined geometries, but also have important implications for the field of tribology.

DTIC

Molecular Ions; Molecules; Solid Surfaces; Thin Films; Tribology

19980015919 Rutherford Appleton Lab., ISIS Facility, Chilton, UK

Theory of Spin Correlations and Neutron Scattering from Paramagnetic Materials Based on the Ising-Heisenberg Model in One, Two and Three Space Dimensions

Lovesey, S. W., Rutherford Appleton Lab., UK; Feb. 1996; 11p; In English

Report No.(s): PB96-152913; RAL-TR-96-008; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Responding to the potential of a new neutron-beam method for studying time-dependent properties of magnetic fluctuations, well suited for quasi two-dimensional magnets, the authors predict the form of the signal for scattering by paramagnetic materials. The model used is expected to describe Rb₂CoF₄ and related quasi two-dimensional magnets, with an Ising-like character. Calculations are made using the coupled-mode theory of spin fluctuations. For Rb₂CoF₄ the authors predict out of plane fluctuations to be the same as for the Heisenberg model, and in plane fluctuations to be different and an exponential function of time.

NTIS

Paramagnetism; Neutron Scattering; Spin; Correlation; Time Dependence

73

NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory. For space radiation see 93 Space Radiation.

19980015172 Commissariat a l'Energie Atomique, Centre d'Etudes de Cadarache, Saint-Paul-les-Durance, France

Evaluation of wrapper tubes temperature of neutron fast reactors by Transcoeur-2

Valentin, B., Commissariat a l'Energie Atomique, France; Brun, P., Commissariat a l'Energie Atomique, France; Chaigne, G., Societe Franco-Americaine de Constructions Atomiques, France; 1995; 14p; In English; 7th; InterNational Meeting on Nuclear Reactor Thermal Hydraulics, 10-15 Sep. 1995, Saratoga, NY, USA

Report No.(s): CEA-CONF-12144; CONF-950904; DE97-620924; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

This paper deals with the thermal loading estimation of wrapper tubes by TRANSCOEUR-2 code. This estimation needs the knowledge of two temperature fields: the first is the peripheral sub-channels temperature of each sub-assembly computed by the design field computed by the thermohydraulic code TRIO-Vf with boundary conditions coming from CADET. The modeling of each code is presented as the first application of TRANSCOEUR-2 is performed on the European Fast Reactor (EFR) Core Design 6/92 (CD 6/91) in the nominal power conditions. The results show a temperature variation between the bottom and the top of the sub-assemblies fuel columns of 110 Celsius grades in the center of the core and 95 Celsius grades at its periphery. The wrapper tubes temperatures are higher in the center than in the external side of the core.

DOE

Control Equipment; Numerical Control; Temperature Distribution

74

OPTICS

Includes light phenomena; and optical devices. For lasers see 36 Lasers and Masers.

19980012549 NERAC, Inc., Tolland, CT USA

Infrared Imaging. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Jan. 1996; In English

Report No.(s): PB96-859590; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning methods and apparatus used in infrared imaging technology. Fabrication and calibration of imaging systems and devices are discussed. Sensing, storage, and conversion methods are

included, and the uses of images in eye examinations and aerial reconnaissance is considered. Citations pertaining specifically to infrared detectors are excluded. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Infrared Imagery

19980012713 National Inst. of Standards and Technology, Boulder, CO USA

Bibliography of the NIST Optoelectronics Division

Smith, A. J., National Inst. of Standards and Technology, USA; Sep. 1997; 88p; In English

Report No.(s): PB98-104094; NISTIR-5065; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Laser characterization continues to be an important activity at NIST. The Optoelectronics Division maintains National standards for laser radiometry at a wide range of laser wavelengths, from the ultraviolet through the mid-infrared. The Division and its predecessor organizations have been providing measurement services for laser power and energy since 1967 and each year conduct more than 200 calibrations for about 50 customers. Many of these involve the calibration of an optical detector or power meter that will serve as a local standard at a customer's facility. Customers represent a wide range of applications areas where an accurate knowledge of laser output is important--materials processing, eye surgery, optical communications, and semiconductor lithography, to name a few.

NTIS

Bibliographies; Electro-Optics; Research Projects; Laser Outputs; Semiconductors (Materials); Characterization

19980014798 Department of the Navy, Washington, DC USA

Red Light Source

Goldberg, Lew, Inventor, Department of the Navy, USA; Sep. 30, 1997; 34p; In English

Patent Info.: US-Patent-Appl-SN-940737

Report No.(s): AD-D018625; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

A narrow band, high power and coherent source of red light in the red (600-650 nm) spectral region is disclosed. The red light source comprises a first optical source for emitting a first light beam at a first wavelength, a second optical source for emitting a second light beam at a second wave length, a combiner for combining the first and second light beams to produce a combined beam, and a nonlinear crystal responsive to the combined beam for producing a sum frequency light beam of red light.

DTIC

Patent Applications; Light Sources; Coherent Radiation; Red Arcs

19980015398 NERAC, Inc., Tolland, CT USA

Nonlinear Optical Fibers. (Latest Citations from the INSPEC Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864020; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning developments, fabrication, evaluations, and applications of nonlinear optical fibers. Topics include single-mode and multimode fibers, frequency conversions, optical amplification and transmission, phase modulation and matching, nonlinear mixing, and optical glasses. Applications in optical communication and laser optics are discussed. Citations concerning nonlinear optical semiconductors, organic materials, and quantum wells are examined in separate bibliographies.

NTIS

Bibliographies; Fiber Optics; Nonlinear Optics; Product Development; Fabrication

19980015744 Research Inst. of National Defence, Avdelningen foer Sensorteknik, Linkoeeping, Sweden

What Is Meant by Smart Image Sensors *Vad Menas med Smarta Bildsensorer*

Gustafsson, T., Research Inst. of National Defence, Sweden; Apr. 1995; 25p; In Swedish

Report No.(s): PB96-126339; FOA-R-95-00117-3.1-SE; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

A prototype of a smart image sensor is being developed. We define a smart image sensor as an integrated circuit containing a detector array and a processor array. The report explains how such a sensor works. Furthermore the features of the smart image sensor are described, and examples of application areas are given.

NTIS

Optical Measuring Instruments; Image Processing; Integrated Circuits

19980015932 Research Inst. of National Defence, Avdelningen foer Sensorteknik, Linköping, Sweden

Stray Light in Optical Sensors: Preliminary Measurements *Stroeljus i Optiska Sensorer: Inledande Maetningar*

Ericson, B., Research Inst. of National Defence, Sweden; May 1995; 63p; In Swedish

Report No.(s): PB96-126370; FOA-R-95-00132-3.1-SE; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Optical sights and image intensifiers could be jammed, and optical seekers could lose their tracking, due to radiation from the sun, antisensor lasers or other light sources. This could happen even if the source of radiation is situated outside the field of view. When an optical sensor is exposed to intense electromagnetic radiation its detector will be jammed by stray light created in the optical system. One way to characterize the jam sensitivity is to determine the Point Source Transmittance (PST), which specifies the fraction of the incident radiation that reaches the detector at different incident angles. Preliminary stray light measurements in the visible wavelength region are made on two commercial camera lenses and one simple 'home made lens'. The results are also compared to a simple computerized calculation. The report describes initial efforts to interpret and analyze the results as well as to evaluate jammed images. Some proposals for further activities are also given. One reason for developing methods for stray light measurements is to make it possible to verify future computer simulations.

NTIS

Optical Measuring Instruments; Image Intensifiers; Incident Radiation; Light Sources; Point Sources; Lasers; Radiation Damage

19980016557 NERAC, Inc., Tolland, CT USA

Near-Field Microscopy. (Latest Citations from the INSPEC Database)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863758; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development and application of near-field optical microscopy systems. Citations focus on device developments such as optical design enhancements and improved detection techniques. Applications include use in biological imaging, optical memories, chemistry, and semiconductor manufacturing. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Optical Microscopes; Microscopy

19980016707 National Inst. of Standards and Technology, Optoelectronics Div., Boulder, CO USA

Bibliography of the NIST Optoelectronics Division

Smith, A. J., National Inst. of Standards and Technology, USA; Derr, L. S., National Inst. of Standards and Technology, USA; Sep. 1995; 67p; In English

Report No.(s): PB96-128210; NISTIR-5041; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The Optoelectronics Division was established in 1994 to provide the optoelectronics industry and its suppliers and customers with comprehensive and technically advanced measurement capabilities, standards, and traceability to those standards. The Division is organized into four groups: the Sources and Detectors Group, the Fiber and Integrated Optics Group, the Optical Components Group, and the Optoelectronic Manufacturing Group, with work in six project areas.

NTIS

Integrated Optics; Bibliographies; Industries

19980016809 National Inst. of Standards and Technology, Optoelectronics Div., Boulder, CO USA

Optical Detector Nonlinearity: Simulation

Yang, S., National Inst. of Standards and Technology, USA; Vayshenker, I., National Inst. of Standards and Technology, USA; Li, X., National Inst. of Standards and Technology, USA; Scott, T. R., National Inst. of Standards and Technology, USA; Zander, M., National Inst. of Standards and Technology, USA; May 1995; 42p; In English

Report No.(s): PB96-165378; NIST/TN-1376; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The authors developed a unified mathematical treatment for five commonly used measurement methods of optical detector nonlinearity and conducted computer simulation to compare these methods for different measurement conditions and data processing options. They found that the triplet and differential methods will give the overall best results, and third and fourth order polynomial representations of the measurement result will yield least total error for a common practical measurement system.

NTIS

Optical Measurement; Computerized Simulation

75
PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion. For ionospheric plasmas see 46 Geophysics. For space plasmas see 90 Astrophysics.

19980013659 Japan Atomic Energy Research Inst., Dept. of Fusion Plasma Research, Tokyo, Japan

An economical consideration of fusion reactor advanced SSTR (A-SSTR)

Kikuchi, Mitsuru, Japan Atomic Energy Research Inst., Japan; Feb. 1997; 19p; In Japanese

Report No.(s): JAERI-Research-97-004; DE97-745405; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A 'Needs-pull' or user-oriented plant design is required for the fusion reactor to be a viable energy plant in this country. Necessary conditions for the fusion reactor are considered from the user's view point. Especially, a low construction cost per kWe of 300 kyen/kWe is set as a target of the commercial fusion reactor. and a possible form of the fusion power plant is discussed. Technical issues, design improvements and the plant overview to improve economical competitiveness of fusion reactor are described based on the concept study of the steady state tokamak reactor established in 1990.

DOE

Low Cost; Economic Factors; Power Plants; Design Analysis; Thermonuclear Power Generation; Plant Design

19980013660 Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas, Inst. de Investigacion Basica, Madrid, Spain

Application of the code SLAC to the study of Ion Extraction Systems in Neutral Injectors *Aplicacion del codigo SLAC al estudio de sistemas de extraccion de iones para inyectores de neutros*

Garcia, M., Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas, Spain; Liniers, M., Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas, Spain; Guasp, J., Centro de Investigaciones Energeticas, Medioambientales y Tecnologicas, Spain; Feb. 1997; 73p; In Spanish

Report No.(s): CIEMAT-820; DE97-748300; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

In this study different extraction geometries for intense ion beams have been analyzed with the code SLAC, in view of its possible application to the neutral injectors of TJ-2. With this aim, we have introduced several modifications in the code in order to correctly simulate the transition between the ion source plasma and the extraction region, which has great impact on the beam optics. These modifications include the introduction of a population of Boltzmann electrons in the transition region, and the implementation of an option to simulate the thermal velocity of the ions in the source. We have found a better agreement between the results obtained with the new version of the code and the experimental data in two well known systems. With this new version of the code two different studies have been carried out: in the first place an optimization of the ATF injectors extraction system for its use on TJ-2, leading to an optimum value of the gap in the energy range 30-40 KeV, and in the second place a systematic study of extraction geometries at 40 KeV. As a result of this second study we have found the combinations of parameters that can be used under different working conditions (e.g. different pulse lengths), leading to acceptable values of the beam divergence.

Author(DOE)

Ion Extraction; Injectors; Computer Programs; Beam Injection

19980013661 Japan Atomic Energy Research Inst., Dept. of Chemistry and Fuel Research, Tokyo, Japan

Cross-field flow of plasma produced in magnetic field by laser resonance photoionization

Matsumoto, Hideya, Ibaraki Univ., Japan; Ikehata, Takashi, Ibaraki Univ., Japan; Mase, Hiroshi, Ibaraki Univ., Japan; Ogura, Koichi, Japan Atomic Energy Research Inst., Japan; Shibata, Takemasa, Japan Atomic Energy Research Inst., Japan; Mar. 1997; 41p; In Japanese

Report No.(s): JAERI-Research-97-025; DE97-750685; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A slow ($v = 750$ m/s) neodymium plasma stream was produced by laser resonance photoionization in a transverse magnetic field of up to 2460 G. The plasma density was in the range of $3.5 \times 10^{(exp 7)} - 1.0 \times 10^{(exp 9)}$ cm^(exp -3). The high-density plasma flowed straight and plasma ions were detected by a planar collector set 57 mm downstream from the position of plasma production. On the contrary, in the case of the low-density plasma, the number of ions detected by the collector decreased with increasing the magnetic field. When the magnetic field was made further stronger, ions were not detected at all. From the parameter survey in the wide range of the plasma density and magnetic field, it is confirmed that the thickness of the polarization layer has to be much smaller than the diameter of the plasma for the cross-field flow of the plasma.

DOE

Crossed Fields; Photoionization; Magnetohydrodynamic Flow; Magnetic Fields

19980015113 Office of Naval Research, Arlington, VA USA

Large Area Plasma Processing System (LAPPS)

Meger, Robert A., Inventor, Office of Naval Research, USA; Fernsler, Richard F., Inventor, Office of Naval Research, USA; Lampe, Martin, Inventor, Office of Naval Research, USA; Manheimer, W. M., Inventor, Office of Naval Research, USA; Aug. 27, 1997; 19p; In English

Patent Info.: US-Patent-Appl-SN-917963

Report No.(s): AD-D018627; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

The large area plasma processing system (LAPPS) is a system wherein an electron beam is used to produce a plasma. A large area uniform plasma is produced where length and width can be comparable (10's-100's of cm) and very much larger than the plasma thickness (approx. 1 cm). The plasma distribution is created independent of the surface to be processed and the bias applied to the surface. The beam-produced plasma has a low intrinsic electron and excitation temperature plasma, allowing the process to be conducted with better control of free radical production. A material, such as a substrate, being processed may be placed in close proximity to plasma with controlled ion bombardment or without substantial bombardment by energetic ions. The system also offers a large available area for gas inflow and removal from the processing chamber and cathode chamber so as not to contaminate the material being processed or damage the cathode.

DTIC

Plasmas (Physics); Electron Beams

19980015183 Chalmers Univ. of Technology, Inst. for Electromagnetic Field Theory and Plasma Physics, Goeteborg, Sweden

On shock wave formation in a magnetized plasma

Stenflo, L., Umea Univ., Sweden; Shvartsburg, A.B., Central Design Bureau for Unique Instrumentation, Russia; Weiland, J., Chalmers Univ. of Technology, Sweden; [1996]; ISSN 0281-1308; 11p; In English

Report No.(s): CTH-IEFT-PP-96-14; DE97-619912; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An exact analytical solution of the nonlinear MHD equations for perturbations travelling across the external magnetic field in a magnetized plasma is presented. Our solution describes the development of the envelope of an initially smooth large amplitude solitary wave. A rapid steepening of the velocity and magnetic field perturbations is shown to occur.

DOE

Plasmas (Physics); Shock Waves; Plasma Waves; Perturbation

19980015219 Japan Atomic Energy Research Inst., Tokyo, Japan

High heat flux testing of HIP bonded DS-Cu/316SS first wall panel for fusion experimental reactors

Hatano, Toshihisa, Japan Atomic Energy Research Inst., Japan; Sato, Satoshi, Japan Atomic Energy Research Inst., Japan; Dai-raku, Masayuki, Japan Atomic Energy Research Inst., Japan; Kuroda, Toshimasa, Japan Atomic Energy Research Inst., Japan; Akiba, Masato, Japan Atomic Energy Research Inst., Japan; Takatsu, Hideyuki, Japan Atomic Energy Research Inst., Japan; Mar. 1997; 75p; In Japanese

Report No.(s): JAERI-Research-97-017; DE97-750682; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

A shielding blanket design in a fusion reactor such as ITER (InterNational Thermonuclear Experimental Reactor) has been proposed to be a modular structure integrated with the first wall. In view of the fabrication, HIP (Hot Isostatic Pressing) method has been proposed for the joining of dispersion strengthened copper (DS-Cu) and type 316L stainless steel (SS316L) at FW. High heat flux tests of HIP bonded DS-Cu/SS316L first wall panel have been performed at Particle Beam Engineering Facility in JAERI to investigate its thermo-mechanical performance. The high heat flux tests consist of four test campaigns. The first two campaigns simulate ITER normal operation conditions in terms of temperature and strain at the HIP bonded interfaces between DS-Cu and SS316L, respectively. The latter two simulate disruption conditions. Under normal heat flux conditions, temperature responses of the first wall panel measured by the thermocouples agreed very well with those predicted by FEM analyses. On the other hand, ejection of a number of small particles from DS-Cu surface was observed during the last campaign with the high heat flux simulating plasma disruptions. After all of the four campaigns, this panel was cut and metallurgically observed. Though melting of DS-Cu surface was observed, there were no cracks at the HIP bonded interface.

DOE

Copper; Thermonuclear Reactions; Plasmas (Physics); Heat Flux; Stainless Steels; Particle Beams; Dispersion Strengthening; Fabrication

19980015332 National Inst. for Fusion Science, Nagoya, Japan

Effects of horizontal injection angle displacements on energy measurements with parallel plate energy analyzer

Fujisawa, A., National Inst. for Fusion Science, Japan; Iguchi, H., National Inst. for Fusion Science, Japan; Lee, S., National Inst.

for Fusion Science, Japan; Hamada, Y., National Inst. for Fusion Science, Japan; Dec. 1996; 14p; In English
Report No.(s): NIFS-471; DE97-750691; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A formula including correction due to change of beam injection angle is derived for measurements of beam energy using parallel plate energy analyzers. The formula is mainly aimed for potential measurements in high temperature plasma with heavy ion beam probes.

DOE

Beam Injection; High Temperature Plasmas; Heavy Ions; Ion Beams

19980015333 Tokyo Univ., Nuclear Engineering Research Lab., Japan

InterNational workshop on interfacial effects in quantum engineering systems (IEQES-96)

1996; 131p; In English, 21-23 Aug. 1996, Mito, Japan; Sponsored by Japan Atomic Energy Research Inst., Japan

Report No.(s): UTNL-R-0342; DE97-750724; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche; Abstracts Only; Abstracts Only

In the interNational workshop on 'interfacial effects in quantum engineering systems (IEQES-96)' organized by Nuclear Engineering Research Laboratory, the University of Tokyo and held on August 21-23, 1996, 108 items were discussed in following 3 sessions. In the first session, on interfacial effects in fusion energy systems, 29 items on Plasma-surface interactions in fusion devices and 14 items on blanket breeder-hydrogen isotope interactions were investigated. In the second session, 38 items on interfacial effects in fission energy systems were discussed. Furthermore, in the third session, 27 items of quantum beam-material interactions were investigated.

DOE

Plasma Interactions; Reactor Technology; Conferences; Fusion Reactors; Blankets (Fusion Reactors); Hydrogen Isotopes

19980015931 California Univ., Electronics Research Lab., Berkeley, CA USA

Object-Oriented Formulations of Particle-in-Cell (PIC) Plasma Simulations Final Report, 1 Jun. 1993 - 31 May 1997

Birdsall, Charles K., California Univ., USA; Mardahl, Peter, California Univ., USA; Jul. 31, 1997; 33p; In English

Contract(s)/Grant(s): F49620-93-I-0354

Report No.(s): AD-A329710; AFOSR-TR-97-0429; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Most of this work involves the OOPIC (or, PIC++) computer simulation program, a particle-in-cell cylindrically symmetric, electromagnetic model of an electron beam in a slow or fast waveguide, or a plasma. This program is written in C++, using an object-oriented design philosophy. The work in progress is a parallelization of XOOPIC. As a serial code, XOOPIC is too slow to handle very large PIC simulations which are of interest to industry. Also, single machines may not have enough memory resource to run XOOPIC efficiently on this class of problems. The aim is to create a distributed version which will take advantage of a network of workstations (NOW).

DTIC

Computerized Simulation; Object-Oriented Programming; Plasmas (Physics); Workstations

19980016659 NERAC, Inc., Tolland, CT USA

Electron Cyclotron Resonance: Deposition and Surface Treatment. (Latest Citations from the Searchable Physics Information Notices Database)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-856158; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning electron beam sources generated by electron cyclotron resonance (ECR) that are used in deposition and surface treatment technology. ECR plasma-enhanced chemical vapor deposition techniques and ECR heated plasma machines are presented. Citations cover the deposition of silicon, silicon oxide, and semiconductor films on various substrates. Surface treatment includes cleaning, modification, and passivation techniques. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Electron Cyclotron Resonance; Surface Treatment; Vapor Deposition

76
SOLID-STATE PHYSICS

Includes superconductivity. For related information, see also 33 Electronics and Electrical Engineering and 36 Lasers and Masers.

19980012525 National Inst. of Standards and Technology, Semiconductor Electronics Div., Gaithersburg, MD USA

NIST List of Publications: LP 103

Walters, J., Editor, National Inst. of Standards and Technology, USA; Mar. 1996; 102p; In English

Report No.(s): PB96-175856; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This List of Publication includes all paper relevant to semiconductor technology published by NIST staff, including work of the National Semiconductor Metrology Program, the Semiconductor Electronics Division, and other parts of NIST having independent interests in semiconductor metrology. Bibliographic information is provided for publications from 1990 through 1995. Within each year, citations of published papers are listed alphabetically by first author. Indexes are provided by topic area and by author. Publications are referred to in the Topic and Author Indexes according to publication year and citation number (i.e., 95-3 refers to the third publication in the year 1995). A listing of software available from the Semiconductor Electronics Division is given on page 57, along with contacts for additional information and for copies of the computer programs.

NTIS

Computer Programs; Semiconductors (Materials)

19980012531 Illinois Univ., Coordinated Science Lab., Urbana, IL USA

GaN Based Structures for NEA by MBE and Investigation of Nitrogen Species and Precursors for Optimum Layer Properties Final Report, 21 May 1989 - 31 Dec. 1997

Morkoc, Hadis, Illinois Univ., USA; Dec. 1997; 14p; In English

Contract(s)/Grant(s): N00014-89-J-1780

Report No.(s): AD-A332734; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We have obtained: ohmic contacts with resistivities below $10(\exp -7)$ Ohm sq cm to n type (GaN which are stable at 500 deg C, Pt Schottky barriers with nearly a unity ideality factor which appear stable at operation temperatures of about 500 deg C, AlGaIn/GaN MODFETs on sapphire substrates with 1.5 micron gate length exhibiting extrinsic transconductances of about 220 mS/mm, drain currents of about 600 mA/mm and breakdown voltages of over 100 V for a 1 micrometer gate-drain separation, Inverted MODFETs on sapphire with extrinsic transconductances of about 80 mS/mm with lesser output negative conductance due to carrier confinement reducing the current path in the buffer layer, AlGaIn/GaN MODFETs on SiC with 1.5 micron gate length exhibiting extrinsic transconductances of about 180 mS/mm, drain currents of about 325 mA/mm with the negative output conductance prevalent on sapphire being absent.

DTIC

Molecular Beam Epitaxy; Negative Conductance; Nitrogen; Sapphire

19980014111 State Univ. of New York, Dept. of Physics and Astronomy, Stony Brook, NY USA

Mechanism of Charge Transfer across Highly Transparent S-N Interfaces in High Temperature Superconductors Progress Report, Aug. 1996 - Jul. 1997

Tolpygo, Sergey K., State Univ. of New York, USA; Averin, Dmitri, State Univ. of New York, USA; Aug. 29, 1997; 6p; In English

Contract(s)/Grant(s): N00014-95-I-0762

Report No.(s): AD-A331038; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This paper includes: the mechanism of charge transfer across highly transparent S-N interfaces in high temperature superconductors.

Derived from text

High Temperature Superconductors; Superconducting Magnets

19980014214 Arizona State Univ., Dept. of Chemistry, Tempe, AZ USA

Characterization of the Crystallization Kinetics of Aqueous LiBr Solutions Annual Report, Aug. 1994 - Jul. 1995

Senapati, H., Arizona State Univ., USA; Angell, C. A., Arizona State Univ., USA; Aug. 1995; 44p; In English

Report No.(s): PB96-165600; GRI-95/0392; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An investigation of homogeneous and heterogeneous nucleation of hydrates of lithium bromide from the aqueous solutions using thermochemical probes is reported. Heterogeneous nucleation is suppressed by use of emulsion sample techniques, and it is found then that the hydrate which crystallizes first is that with the composition closest to the composition of the solution. Careful warmup studies using both DTA and DSC measurements have been used to obtain the most complete LiBr-H₂O phase diagram

yet available and simultaneously to obtain boiling points and glass transition temperatures which are sensitive to watercation cohesion and total cohesion, respectively. Lithium dihydrate crystallization from bulk solutions is strongly repressed by addition of anion-complexing salts like ZnBr_2 . Thus complexation of $\text{Br}(-1)$ by ZnBr_2 or ZnCl_2 leads, favorably, to increased boiling points as well as decreased crystallization temperatures.

NTIS

Crystallization; Kinetics; Aqueous Solutions; Hydrates; Lithium Compounds

19980014532 NERAC, Inc., Tolland, CT USA

Color Liquid Crystal Displays (LCDs) (Latest Citations from the INSPEC Database)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-863311; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, development, and applications of color liquid crystal displays (LCDs). Topics include color polarizers, color filters, guest-host mode, birefringence, color gamut, and color evaluation. Citations also discuss applications in laptop computers, avionic display, automotive instruments, color television, and desktop publishing. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Liquid Crystals; Display Devices

19980014799 Commissariat a l'Energie Atomique, Paris, France

InterNational Conference on II-VI Compounds

Aug. 29, 1997; 58p; In English; 8th, 25-29 Aug. 1997, Grenoble, France

Contract(s)/Grant(s): N68171-97-M-5472

Report No.(s): AD-A331571; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The 8th InterNational Conference on II-VI Compounds will be held in Grenoble, 25-29 August 1997. This is a continuation of the series of meetings held in Durham (1982), Aussois (1985), Monterey (1987), Berlin (1989), Tamano (1991), Newport (1993) and Edinburgh (1995). It is organised in partnership by the three laboratories in Grenoble involved in II-VI semiconductors research: the CEA / DRFMC, the CNRS / University J. Fourier, and the CEA / LETI. The conference will focus on fundamental aspects and on recent perspectives for applications of narrow and wide bandgap II-VI semiconductors. Areas of interest include: materials science, where many long-standing problems (particularly compensation) are still to be solved, low-dimensional physics including semi-magnetic heterostructures, and optoelectronic applications.

DTIC

Conferences; Semiconductors (Materials); Energy Gaps (Solid State); Chemical Compounds

19980015104 NERAC, Inc., Tolland, CT USA

Gallium Arsenide Technology: Field Effect Integrated Circuits. (Latest citations from the INSPEC Database)

Apr. 1996; In English; Page count unavailable.

Report No.(s): PB96-868583; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning gallium arsenide (GaAs) technology in field effect integrated circuits and devices. The design, fabrication, and evaluation of Schottky gate field effect transistors, microwave and wideband amplifiers, semiconductor switches, and high electron mobility transistors are presented. Applications in high speed switching and data processing, mobile communication, nuclear and cryogenic electronics, satellite broadcasting, and phased array radars are examined. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Field Effect Transistors; Gallium Arsenides

19980015114 Department of the Navy, Washington, DC USA

Process for Forming Epitaxial BaF_2 on GaAs

Chu, Tak-Kin, Inventor, Department of the Navy, USA; Santiago, Francisco, Inventor, Department of the Navy, USA; Stumborg, Michael, Inventor, Department of the Navy, USA; May 31, 1995; 13p; In English

Patent Info.: US-Patent-Appl-SN-454983

Report No.(s): AD-D018630; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

A process for growing single crystal epitaxial BaF₂ layers on gallium arsenide substrates by slowly reacting Ba, BaCl₂, BaI₂, BaBr₂, BaF₂.BaCl₂, BaF₂.BaBr₂, BaF₂.BaI₂, BaCl₂.BaBr₂, Ba₃(GaF₆)₂, BaH₂, or BaO₂ vapor with a clean, hot GaAs substrate at 500 to 700 deg C in high vacuum until a uniform, thin (tilde 12A) layer of reaction product is formed and then vapor depositing BaF₂ onto the reaction layer at room temperature to 400 deg C to form the single crystal, epitaxial BaF₂ layer.

DTIC

Single Crystals; Epitaxy; Barium Fluorides

19980015144 California Univ., Quantum Inst., Santa Barbara, CA USA

Resonant Tunneling and Hot Electron Spectroscopy in Buried Rare-Earth Arsenide/Semiconductor Heterostructures Final Report, 1 May 1993 - 30 Apr. 1997

Allen, S. J., California Univ., USA; Apr. 30, 1997; 7p; In English

Contract(s)/Grant(s): F49620-93-I-0329; AF Proj. 2305

Report No.(s): AD-A329786; AFOSR-TR-97-0467; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A new materials arena has been opened for quantum electron transport devices based on magnetic, semi-metal compound semiconductor heterostructures. Epitaxial ultrathin films of a rare earth arsenide, ErAs, were grown in GaAs semiconductors. The dissimilarities between the ErAs, a magnetic semimetal, and the compound semiconductor make possible the fabrication of three terminal resonant tunneling transistors with ultra thin semi-metal quantum wells. Resonant tunneling through semi-metal quantum wells was observed for the first time. A strong coupling of the magnetization and the resonant tunneling was discovered that demonstrates magnetization controlled resonant tunneling. Nano-composites of ErAs / GaAs were also grown. Electron transport in these systems exhibits giant magneto-resistance, magnetization controlled island to island electron hopping transport. This research program has opened the possibility of high density, non-volatile information storage and processing based on magnetic, semi-metallic, quantum structures grown and integrated into compound semiconductor heterostructures.

DTIC

Electron Spectroscopy; Electron Transfer; Hot Electrons; Magnetic Field Configurations; Magnetic Materials; Magnetization; Quantum Wells; Rare Earth Elements; Resonant Tunneling

19980015180 Los Alamos National Lab., NM USA

Chaos, scaling and existence of a continuum limit in classical non-Abelian lattice gauge theory

Nielsen, H. B., Niels Bohr Inst., Denmark; Rugh, H. H., Warwick Univ., UK; Rugh, S. E., Los Alamos National Lab., USA; 1996; 12p; In English; 28; InterNational Conference on High-energy Physics, 25 - 31 Jul. 1996, Warsaw, Poland

Contract(s)/Grant(s): W-7405-eng-36; PHY94-07194

Report No.(s): LA-UR-96-4455; CONF-960765-51; DE97-003136; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

We discuss space-time chaos and scaling properties for classical non-Abelian gauge fields discretized on a spatial lattice. We emphasize that there is a 'no go' for simulating the original continuum classical gauge fields over a long time span since there is a never ending dynamical cascading towards the ultraviolet. We note that the temporal chaotic properties of the original continuum gauge fields and the lattice gauge system have entirely different scaling properties thereby emphasizing that they are entirely different dynamical systems which have only very little in common. Considered as a statistical system in its own right the lattice gauge system in a situation where it has reached equilibrium comes closest to what could be termed a 'continuum limit' in the limit of very small energies (weak non-linearities). We discuss the lattice system both in the limit for small energies and in the limit of high energies where we show that there is a saturation of the temporal chaos as a pure lattice artifact. Our discussion focuses not only on the temporal correlations but to a large extent also on the spatial correlations in the lattice system. We argue that various conclusions of physics have been based on monitoring the non-Abelian lattice system in regimes where the fields are correlated over few lattice units only. This is further evidenced by comparison with results for Abelian lattice gauge theory. How the real time simulations of the classical lattice gauge theory may reach contact with the real time evolution of (semi-classical aspects of) the quantum gauge theory (e.g. Q.C.D.) is left an important question to be further examined.

DOE

Computerized Simulation; Quantum Theory; Nonlinearity; Measuring Instruments; Continuums

19980015242 Georgia Univ., Dept. of Chemistry, Athens, GA USA

Electrochemical Atomic Layer Epitaxy, May 1996 - Sep. 1997

Stickney, John L., Georgia Univ., USA; Oct. 16, 1997; 206p; In English

Contract(s)/Grant(s): N00014-91-J-1919

Report No.(s): AD-A331054; TR-29; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

This is a review of work performed in the P.I.'s laboratory concerning development of the method of electrochemical atomic layer epitaxy. It includes an introduction covering compound semiconductor electrodeposition, with a table containing about 400 references. It contains a chapter on thin layer electrochemical studies, which are frequently used to get an initial idea of the conditions that should be used in an automated deposition cycle. There is a section on the development of the automated flow deposition system, and the growth of thin films of CdTe. There is a section on the atomic level characterization of these films using surface analytical methods. There is a section on the inverse of electrochemical ALE, digital etching. In those studies atomic layers are removed one at a time. There is also a conclusions section describing here we feel these techniques are going.

DTIC

Atomic Layer Epitaxy; Cadmium Tellurides; Electrodeposition; Semiconductors (Materials); Thin Films

19980015253 Carnegie-Mellon Univ., Pittsburgh, PA USA

Studies of Surface Processes during Growth of Epitaxial Boron Nitride Final Report, 1 Jun. 1993 - 31 May 1997

Greve, D. W., Carnegie-Mellon Univ., USA; Jul. 29, 1997; 27p; In English; Double Print

Contract(s)/Grant(s): F49620-93-1-0387; AF Proj. 3484

Report No.(s): AD-A329701; AFOSR-TR-97-0426; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Cubic boron nitride has proven to be a challenging semiconductor to grow epitaxially. In large part this is due to its chemical similarity to diamond in that the hexagonal (or graphitic) sp²-bonded phase often forms at ambient conditions rather than the sp³-bonded form. In this contract, we have investigated the possible formation of sp³-bonded forms of BN on particularly suitable substrates. Both Ni(100) and AlN have been studied. A careful study of the Ni(100) surface has shown that the hexagonal phase is formed when diborane and ammonia react thermally (without ionic bombardment). Work on AlN substrates is less complete but so far no evidence for formation of the sp³-bonded phase has emerged.

DTIC

Boron Nitrides; Epitaxy; Semiconductors (Materials); Ammonia; Nickel; Diborane; Metal Surfaces

19980015640 Brown Univ., Div. of Engineering, Providence, RI USA

Mixed Atomistic/Continuum Studies of Defects in Electronic and Materials Final Report, 1 Jan. 1992 - 31 Dec. 1994

Freund, L. B., Brown Univ., USA; Ortiz, M., Brown Univ., USA; Phillips, R., Brown Univ., USA; Mar. 07, 1995; 7p; In English

Contract(s)/Grant(s): F49620-92-J-0129

Report No.(s): AD-A329711; AFOSR-TR-97-0489; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Deformation processes in crystalline materials of engineering significance are considered which are beyond the reach of atomistic simulations, due to the need to consider practically significant volumes of material, and beyond the reach of continuum mechanics, due to need to consider physical aspects of material defects. This work is based on a method of spatial discretization well suited to multiple scale analysis and the explicit consideration of the lattice geometry in the reference consideration of the crystal. Computational strategies have been developed which (1) include stable lattice defects (dislocations) in the solution (2) yield an unambiguous value for dislocation core energy, (3) agree with atomistic theory over those small regions where they can be compared, and (4) produce an approach to integration of crystalline defect physics into continuum analysis which is currently being pursued for several applications. In addition, a continuum study of dislocation nucleation at the surface of a highly stressed solid has been pursued which takes into account the core structure of the dislocation. While the activation energy for this process estimated on the basis of dislocations without core features is unrealistically large, it is found that the inclusion of structure brings the activation energy estimates into the range of physically realizable behavior.

DTIC

Continuum Mechanics; Crystal Defects; Crystallinity; Deformation; Nucleation; Simulation; Stability

19980015642 California Univ., Quantum Inst., Santa Barbara, CA USA

Non-Linear Terahertz Electronics with Self Organized Rare-Earth Arsenide Semi-Metal/Semiconductor Composites Final Report, 1 Aug. 1993 - 31 Jul. 1997

Allen, S. James, California Univ., USA; Jan. 1996; 7p; In English

Contract(s)/Grant(s): F49620-93-I-0440; AF Proj. 3484

Report No.(s): AD-A329713; AFOSR-TR-97-0466; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A new materials arena has been opened for quantum electron transport devices based on magnetic, semi-metal compound semiconductor heterostructures. Epitaxial ultrathin films of a rare earth arsenide, ErAs, were grown in GaAs semiconductors. The dissimilarities between the ErAs, a magnetic semimetal, and the compound semiconductor make possible the fabrication of three terminal resonant tunneling transistors with ultra thin semi-metal quantum wells. Resonant tunneling through semi-metal quan-

tum wells was observed for the first time. A strong coupling of the magnetization and the resonant tunneling was discovered that demonstrates magnetization controlled resonant tunneling. Nano-composites of ErAs / GaAs were also grown. Electron transport in these systems exhibits giant magnetoresistance magnetization controlled island to island electron hopping transport. This research program has opened the possibility of high density, non-volatile information storage and processing based on magnetic, semi-metallic, quantum structures grown and integrated into compound semiconductor heterostructures.

DTIC

Electron Transfer; Gallium Arsenides; Magnetic Field Configurations; Magnetic Materials; Magnetoresistivity; Quantum Wells; Rare Earth Elements; Resonant Tunneling; Semiconductors (Materials)

19980016625 Royal Inst. of Tech., Dept. of Mathematics, Stockholm, Sweden

Negative Discrete Spectrum of a Two-Dimensional Schroedinger Operator

Birman, M. S., Royal Inst. of Tech., Sweden; Laptev, A., Royal Inst. of Tech., Sweden; Aug. 1995; 30p; In English
Report No.(s): PB96-125935; TRITA/MAT-95/MA-16; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In this paper we study the asymptotics of the discrete negative spectrum of a two dimensional Schrodinger operator with a large coupling constant. In particular some 'non-standard' formulae are obtained.

NTIS

Quantum Electronics; Schroedinger Equation

19980016735 Grand Accelerator National d'Ions Lourds, Caen, France

Anomalous diffusion of fermions in superlattices

Drozdz, S., Institute of Nuclear Physics, Poland; Okolowicz, J., Institute of Nuclear Physics, Poland; Srokowski, T., Institute of Nuclear Physics, Poland; Ploszajczak, M., Grand Accelerator National d'Ions Lourds, France; Mar. 1996; 12p; In English
Report No.(s): GANIL-P-96-09; DE97-626103; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

Diffusion of fermions in the periodic two-dimensional lattice of fermions is studied. It is shown that effects connected with antisymmetrization of the wave function increase chaoticness of motion. Various types of anomalous diffusion, characterized by a power spectral analysis are found. The nonlocality of the Pauli potential destroys cantori in the phase space. Consequently, the diffusion process is dominated by long free paths and the power spectrum is logarithmic at small frequency limit.

DOE

Diffusion; Fermions; Superlattices; Transport Theory; Wave Functions; Chaos; Field Theory (Physics)

19980016742 Bureau of Mines, Reno Research Center, Reno, NV USA

Factors Related to Laboratory Production and Evaluation of Berlinite Crystal

Macdonald, D. J., Bureau of Mines, USA; 1995; 24p; In English
Report No.(s): PB96-131271; BUMINES-IC-9435; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The purpose of this report is to review published information on synthetic berlinite (AlPO₄), and to suggest experimental conditions requisite for its production. The Bureau of Mines' interest in berlinite relates to the Bureau's mission to help ensure that the USA has an adequate supply of mineral-based materials. Berlinite is a piezoelectric material with potential use as a substitute for quartz in the crystal oscillators which are components of electronic and electroacoustic equipment. Information gathered here (mostly from published sources) includes historical background, physical properties, end-use applications, criteria of quality, and physico-chemical factors involved in berlinite crystal growth.

NTIS

Inorganic Compounds; Crystals; Evaluation; Laboratories; Crystal Oscillators; Physical Chemistry; Aluminum Compounds

19980016795 Princeton Resources, Inc., NJ USA

Proceedings of the InterNational Symposium on Integrated Ferroelectrics, Part 2

Taylor, G. W., Princeton Resources, Inc., USA; Kingon, A. I., Princeton Resources, Inc., USA; PazdeAraujo, C. A., Princeton Resources, Inc., USA; Nov. 1995; 330p; In English; 7th, 20-22 Mar. 1995, Colorado Springs, CO, USA
Report No.(s): PB96-156559; Copyright Waived; Avail: CASI; A15, Hardcopy; A03, Microfiche

This paper includes: Guest Editorial; Organizers and Committees; Applications and Devices--Optical; Applications and Devices--DRAMS; Applications and Devices--NVMS; Applications and Devices--Microsensors; Integration; Modeling; Author Index; Announcements.

NTIS

Ferroelectricity; Thin Films

THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; theoretical physics; and Bose and Fermi statistics. For related information see also 25 Inorganic and Physical Chemistry and 34 Fluid Mechanics and Heat Transfer.

19980013047 Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette, France

Quantum Fluctuations in the Open Universe

Moschella, U., Institut des Hautes Etudes Scientifiques, France; Schaeffer, R., Saclay Research Centre, France; May 1997; 6p; In English

Report No.(s): PB97-176747; IHES/P/97/45; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

We solve a continuing controversy when dealing with density fluctuations in open Friedman-Robertson-Walker (FRW) universes, on the physical relevance of a class of exponential modes. We show explicitly and rigorously that these modes enter the expansion of quantum fields. In the maximally symmetric de Sitter case, encountered in inflationary models, they are excited for fields with mass below a critical value $M(\text{sub cr})$. They are seen to be responsible for the breaking of the de Sitter symmetry for a massless field. We provide an exact calculation of the power spectrum for any mass. Our method is free of the divergences that appear in earlier treatments and can be extended to a generic open FRW universe.

NTIS

Universe; Spectra; Quantum Mechanics; Fluctuation Theory

19980013933 NERAC, Inc., Tolland, CT USA

Quantum Chaos (Latest Citations from the INSPEC Database)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-862586; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the studies of quantum chaotic systems and dynamics. Citations discuss chaotic models, Hamiltonian systems, representations, spectroscopy, spin systems, fermion systems, dynamic symmetries, and fractals. Chaotic analyses of semiconductor devices and structures, microwave devices, quantum-optical devices, quantum-kicked rotors and tops, and nuclear reactions are examined. Quantum models of hydrogen neutral atoms in magnetic fields, van der Waals potentials, and microwave fields are presented. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Chaos

19980015111 Army Research Lab., Aberdeen Proving Ground, MD USA

Critical Review of the Heats of Formation of HNO and Some Related Species Final Report, 1992 - 1997

Anderson, William R., Army Research Lab., USA; Nov. 1997; 50p; In English

Contract(s)/Grant(s): DA Proj. 1L1-61102-AH-43

Report No.(s): AD-A332920; ARL-TR-1557; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

A critical review of the heat of formation of HNO is presented. This molecule and its thermodynamics parameters play crucial roles in the chemical mechanism of propellant combustion and NO(x) pollutant chemistry. It was found that predissociation experiments, which have gone largely unnoticed for over 15 yr, lead to a significant revision in the recommended value. The new value, 25.6 ± 0.6 kcal/mol and 25.6 ± 0.1 kcal/mol (298 K; 26.3 kcal/mol at 0 K), is 1 to 2 kcal/mol higher than previous recommendations and has much narrower error limits. Heats of formation of NO, NH₂OH, (HNO)(+), and (HNO)(-) are also briefly examined, and recommendations are made. Finally, recommendations for future experiments and a brief survey of methods of production of HNO are given in the hope that these will facilitate future studies.

DTIC

Heat of Formation; Nitric Acid; Thermodynamics; Gun Propellants; Hydrazoic Acid; Propellant Combustion; Reaction Kinetics

19980015182 Istituto Nazionale di Fisica Nucleare, Frascati, Italy

Gravitational wave observatory based on solid elastic spheres

Coccia, E., Rome Univ., Italy; Lobo, J. A., Barcelona Univ., Spain; Ortega, J. A., Barcelona Univ., Spain; Jul. 1995; 11p; In English

Report No.(s): LNF-P-95-033; DE97-732491; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)) (US Sales Only), Microfiche

Spherical GW detectors offer a wealth of so far unexplored possibilities to detect gravitational radiation. A sphere can be used as a powerful testbed for any metric theory of gravity, not only GR as considered so far, by making use of a deconvolution procedure for all the 'electric' components of the Riemann tensor. It is also found that the sphere's cross section is large at two frequencies, and advantageous at higher frequencies in the sense that a single antenna constitutes a real xylophone in its own. Proposed GW networks will greatly benefit from this. The main features of a two large sphere observatory are reported.

DOE

Antennas; Cryogenics; Gravitational Waves; Spheres; Relativistic Theory; Riemann Manifold

19980015393 Rutherford Appleton Lab., ISIS Facility, Chilton, UK

Thermodynamics of Two-Dimensional XXZ Easy-Plane Quantum Heisenberg Magnets

Capriotti, L., Florence Univ., Italy; Cuccoli, A., Florence Univ., Italy; Tognetti, V., Florence Univ., Italy; Vaia, R., Consiglio Nazionale delle Ricerche, Italy; Verrucchi, P., Rutherford Appleton Lab., UK; Sep. 1996; 6p; In English

Report No.(s): PB97-105308; RAL-TR-96-070; Copyright Waived; Avail: CASI; A02, Hardcopy; A01, Microfiche

The authors consider the quantum easy-plane (XXZ) magnet on the square lattice. In the classical case the system exhibits the Berezinskii-Kosterlitz-Thouless transition. Simulations, both for ferro- and antiferromagnets, using the method of the effective classical Hamiltonian, are made for different spin values and refer to the specific heat, the static spin correlation functions and correlation lengths in a broad range of temperatures, below and above the transition. The effects of quantum fluctuations are quantitatively evaluated and discussed.

NTIS

Magnets; Thermodynamics

19980015627 Institut des Hautes Etudes Scientifiques, Paris, France

Gravity Coupled with Matter and the Foundation of Non Commutative Geometry

Connes, A., Institut des Hautes Etudes Scientifiques, France; Mar. 1996; 32p; In English

Report No.(s): PB96-186465; IHES/M/96/22; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The authors first exhibit in the commutative case the single algebraic relations between the algebra of functions on a manifold and its infinitesimal length element ds . The authors extend its simple relations to the non commutative case using Tomita's involution J . The authors then write a spectral action, the trace of a function of the length element, which when applied to the non commutative geometry of the Standard Model will be shown (in a joint work with Ali Chamseddine) to give the SM Lagrangian coupled to gravity.

NTIS

Matter (Physics); Manifolds (Mathematics); Gravitation

19980016643 Royal Inst. of Tech., Dept. of Mathematics, Stockholm, Sweden

Two-Level Large Deviations Principle for Interacting Jump Processes

Djehiche, B., Royal Inst. of Tech., Sweden; Schied, A., Royal Inst. of Tech., Sweden; 1995; 23p

Report No.(s): PB96-125968; TRITA/MAT-95/MS-3; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A large deviations principle from the McKean-Vlasov limit for a collection of jump processes obeying a two-level hierarchy interaction is derived. It is shown that the associated rate function admits a Lagrangian representation as well as a non-variational one. Moreover, it is proved that the admissible paths for the weak solution of the McKean-Vlasov equation enjoy certain strong differentiability properties.

NTIS

Lagrangian Function; Vlasov Equations

19980016791 Rutherford Appleton Lab., Chilton, UK

Bose Condensation and the Static Pair Correlation Function in He-4

Mayers, J., Rutherford Appleton Lab., UK; Apr. 1996; 36p; In English

Report No.(s): PB96-176185; RAL-P-96-004; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

It is shown that the pair correlations in a Bose fluid should be reduced in the presence of a Bose condensate (BC) and that measurements of the static pair correlation function, $g(\mathbf{r} \text{ vector})$, in superfluid He-4 provide direct evidence of the existence of the condensate wavefunction. In the presence of a BC fraction f , one would expect a reduction in the amplitude of oscillations in $g(\mathbf{r} \text{ vector}) - \rho$, by a factor $((1-f)(\exp 2))$, as is observed experimentally. A number of well known results of the theory of super-

fluidity are given new proofs. A clear physical picture is given of the nature of the microscopic processes involved in Bose condensation superfluidity and loss of spatial correlations.

NTIS

Quantum Statistics; Superfluidity; Wave Functions; Correlation; Helium Isotopes; Condensates

80

SOCIAL SCIENCES (GENERAL)

Includes educational matters.

19980012563 Lehigh Univ., Bethlehem, PA USA

Advanced Education and Training Technologies Consortium: The Northeast Regional Consortium Program, Phase 1, Proof of Concept and Planning Final Report

Zimmers, E. E., Lehigh Univ., USA; Tuscher, Leroy J., Lehigh Univ., USA; Sep. 11, 1997; 5p; In English

Contract(s)/Grant(s): MDA972-95-I-0014

Report No.(s): AD-A329491; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The Enterprise Systems Center (ESC) at the Lehigh University successfully completed the project in December 1995. The ESC worked closely with the members of ARPA Northeast Regional Consortium and provided leadership and planning support to embrace and adopt an Agile Learning Paradigm. Enterprise Systems Centers project was concentrated on researching the needs and opportunity and providing leadership to the members of the consortium. In Phase I, scope of the project involved: (1) scope training needs and related technological advances (evaluate needs, develop training framework in agile paradigm, and analyze potential of technologies); and (2) adapt agile paradigm to learning.

DTIC

Education; ARPA Computer Network; Learning

19980014087 Kuwait Univ., Safat, Kuwait

Kuwait Journal of Science and Engineering: An InterNational Journal of Kuwait University, Volume 23, No. 2, December 1996

Al-Musallam, A. A., Kuwait Univ., Kuwait; Dec. 1996; 191p; In English

Report No.(s): PB97-136394; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

Contents include the following: Some characterizations of CR-submanifolds of generalized complex space forms; Nearly trans-sasakian manifolds; Anti-invariant submanifolds of a Kenmotsu manifold; Recursion and iteration in computer programming; Quasi-static load balancing in local area networks; Aircraft sortie performance model; Indoor air quality in Kuwaiti house: pollutants and their concentrations; A simple approach for the estimation of the mass transfer coefficients and diffusion coefficients of vanadium in Kuwait crude oils: an elution study; Chemical concentrations in soil and groundwater in Kuwait; The interface angle of friction between dry sand and lubricated surfaces; Structural complexities in an aluminate sodalite; and Shallow crustal structure in Kuwait based on gravity anomalies.

NTIS

Mathematics; Statistics; Geology; Manifolds; Computer Programming; Local Area Networks; Chemical Engineering

19980014524 Naval Postgraduate School, Monterey, CA USA

Videoteleducation: Lessons Learned

Reed, Dorothy J., Naval Postgraduate School, USA; Mar. 1997; 91p; In English

Report No.(s): AD-A331828; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

VideoTelEducation (VTE) is a method of education and training that is occurring more frequently in corporate, military, and educational environments. VTE provides education and training to people who cannot or who prefer not to attend traditional educational institutions, to employees or companies who need timely information, and to those who seek cost savings for training widely dispersed groups of people. This study uses personal interviews of professors and trainers in both the military and civilian sector and reviews the VTE literature to determine lessons learned from VTE. Results show that VTE causes changes in instructional design, physical, administrative and technological support, production facilities, and student/teacher preparation. The transition from a live classroom to VTE requires teachers to develop new skills and behaviors. Additionally, VTE saves costs and effectively delivers training as shown in studies of private corporations, federal agencies, educational institutions, and the military. However, VTE is not applicable to all courses and teaching methodologies. While researchers claim that VTE is effective, they

often have not applied appropriate evaluation measures to their claims of VTE efficiency and effectiveness. Decision-makers should conduct thorough analyses and exercise caution before committing to a VTE program based on the claims in the literature.

DTIC

Education; Training Devices; Cost Reduction; Physical Exercise

81

ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

19980012545 NERAC, Inc., Tolland, CT USA

Just in Time Production Systems. (Latest citations from the NTIS Bibliographic Database)

Jan. 1996; In English

Report No.(s): PB96-859913; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning computers and software programs used to implement just in time production systems (JIT). Topics include computer aided manufacturing, production management, quality control, and information management. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Production Management; Computer Programs

19980014112 RAND Corp., Santa Monica, CA USA

DOD Outsourcing; How Civil Service Employees Fare *Topical Report*

Jan. 1997; 2p; In English

Report No.(s): AD-A331025; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

According to a 1995 report by the Commission on Roles and Missions of the Armed Forces, the Department of Defense (DoD) continues to employ at least 250,000 civil service workers in commercial activities that could be operated more cheaply if outsourced. Part of the reason for this situation is that certain executive and legislative directives overlap and sometimes conflict, with the former tending to favor outsourcing and the latter tending not to. Despite these problems, there is growing evidence that the tempo of outsourcing will significantly pick up in the future, driven by Congressional Budget Office and Center for Naval Analyses findings that outsourcing can reduce the cost of commercial activities by about a third. In light of this trend, RAND researchers sought to answer two questions: What factors affect the competitiveness of civil service employees in the cost-comparison process used to evaluate outsourcing possibilities; and what are the impacts of past and future outsourcings on civil service employees?

DTIC

Armed Forces; Cost Reduction; Defense Program

19980014821 National Performance Review, Washington, DC USA

Serving the American Public: Best Practices in Performance Measurement

Gore, A., National Performance Review, USA; Jun. 1997; 63p; In English

Report No.(s): PB97-190797; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Contents include the following: Executive Summary; Introduction; Summary of Best Practices in Performance Measurement; Strategies for Successful Performance Measurement; Appendices.

NTIS

Surveys; Systems Analysis

19980015177 Eagle Eye Publishers, Inc., Vienna, VA USA

Bundled Contract Study, FY 1991- FY 1995 *Final Report*

Jun. 20, 1997; 135p; In English

Report No.(s): PB97-180731; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The purpose of this study was to determine the impact that consolidating small, individual government purchases into larger, bundled contracts and raising the small purchase threshold to \$100,000 has had on small business participation in federal contracting. The data used for this study describe various characteristics of contractual obligations made between the federal govern-

ment and prime contractors from FY1991 to FY1995 (note that subcontract and budget data are not included). The Federal Procurement Data Center (FPDC) provided the data for this study.

NTIS

Contract Management; Government Procurement; Contractors; Contract Negotiation

19980015193 George Washington Univ., Law School, Washington, DC USA

Expert Witness Discovery Versus the Work Product Doctrine: Choosing a Winner in Government Contract Litigation

Cohen, Leonard M., George Washington Univ., USA; Sep. 30, 1997; 118p; In English

Report No.(s): AD-A331065; AFIT/CIA-97-140; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Before an expert witness ever takes the stand at trial, the attorney who will cross-examine the expert has already made some attempt to discover the information underlying the expert's testimony (unless the attorney wants to actually use his or her malpractice insurance). In the federal courts, expert witness discovery is guided by the subdivisions of the federal rule addressing expert discovery, Federal Rule of Civil Procedure 26. Typically, the discovery process begins with the party who intends to offer expert witness testimony at trial providing the identity of the party's testifying expert to the opposing party. Anyone identified as a testifying expert prepares a written report stating the opinions to which the expert will testify, the bases of the opinions, and the data used in forming the opinions. THE WORK PRODUCT DOCTRINE. One of the surest methods of pausing, if not stopping, a line of deposition questions is to say: "Objection, calls for attorney work product." Attorney work product is treated as almost sacred ground. The Supreme Court provided its sacrosanct text defining attorney work product in *Hickman V. Taylor* 329 U.S. 495 (1947). *Hickman* held "written materials obtained or prepared by an Attorney with an eye toward litigation are protected as attorney work product. Work product also encompasses communications that contain the mental impressions of an attorney, though facts alone are not attorney work product.

DTIC

Insurance (Contracts); Legal Liability; Stopping; Texts

19980015221 NERAC, Inc., Tolland, CT USA

Participative Organizational Development . (Bibliography from the Management & Marketing Abstracts Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864475; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning human resource development theories and practices, including participative management, quality circles, team building, and job enrichment. The citations examine specific case studies, the effect on job satisfaction and workplace synergies, implementation strategies, and obstacles to effective introduction. Some references cite the effect of engineering management on resulting creativity, productivity, cost reduction, motivation, communication, and decision making.

NTIS

Engineering Management; Bibliographies; Group Dynamics; Personnel Development

19980015245 RAND Corp., Santa Monica, CA USA

Outsourcing of DOD Commercial Activities Impacts on Civil Service Employees

Robbert, Albert A., RAND Corp., USA; Gates, Susan M., RAND Corp., USA; Elliot, Marc N., RAND Corp., USA; Jan. 1997; 130p; In English

Contract(s)/Grant(s): DASW01-95-C-0059

Report No.(s): AD-A331042; RAND-MR-866-OSD; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Responding to recommendations from the Commission on Roles and Missions of the Armed Forces, the Office of the Secretary of Defense (OSD) is investigating opportunities to increase the scope and pace of outsourcing of commercial activities. Outsourcing can reduce the cost of commercial activities directly, by taking advantage of efficiencies found in the competitive private sector, or indirectly, by inducing activities that remain in-house to operate more efficiently. Either way, civil service employees are likely to be displaced, presenting Department of Defense (DoD) managers of the civil service workforce with a range of issues. Accordingly, OSD managers of civil service employees have an interest in predicting and understanding the effects of this intensified examination of DoD outsourcing opportunities. At the request of the Deputy Assistant Secretary of Defense for Civilian Personnel Policy, RAND undertook a study to examine these effects. Findings of the study should be of interest to OSD, service, and defense agency personnel managers, especially those responsible for programs to assist displaced workers and those who have an interest in the cost and productivity of workforces. Managers of outsourcing and cost-comparison processes should also have

an interest in some of the findings. This report was prepared under the sponsorship of the Office of the Assistant Secretary of Defense for Force Management Policy. It was prepared within the Forces and Resources Policy Center of RAND's.

DTIC

Defense Program; Efficiency; Personnel; Policies; Predictions; Productivity

19980015250 General Accounting Office, Resources, Community and Economic Development Div., Washington, DC USA

Inspection and Maintenance Contracts and Grants

Sep. 26, 1996; 41p; In English

Report No.(s): PB97-208797; GAO/RCED-96-250R; B-274459; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

To address the problem of air pollution from motor vehicles, EPA requires states to implement inspection and maintenance (I/M) programs to help ensure that vehicles are being maintained adequately. This report: (1) determines the number and value of the contracts and grants issued or used during the period November 5, 1992, through September 30, 1995, to support EPA's I/M program; and (2) describes the scope of work and tasks completed under the contracts and grants specifically related to the I/M program.

NTIS

Air Pollution; Inspection; Motor Vehicles; Environment Protection

19980015329 NERAC, Inc., Tolland, CT USA

User Interface Management Systems. (Latest Citations from the INSPEC Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-863949; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, development, and implementation of user interface management systems (UIMS), a newly developed software tool. Emphasis is placed upon the dialogue control component for processing user actions and coordinating program responses. UIMS provides quick implementation and modification of user interfaces for numerous applications, and provides the end-user a friendly run-time interface environment. Topics include user interface software development and UIMS concepts, components, and functions; guidelines for design and selection of UIMS; and commercially available systems. Computer-aided design and manufacturing, object-oriented UIMS, and artificial intelligence techniques are also covered.(Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Management Systems

19980015371 National Oceanic and Atmospheric Administration, Systems Acquisition Office, Silver Spring, MD USA

Guidebook for the Preparation of Open Systems Interconnection (OSI) Interface Documents Final Report

Apr. 1996; 114p; In English

Report No.(s): PB96-168786; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This Guide was prepared to help Government and contracting personnel involved in the definition of open systems interface requirements and/or design. The guidebook presents information on the development of interface documentation, the Open Systems Interconnection (OSI) Reference Model, and open systems internetworking. This document provides recommendations for the preparation of Interface Requirements Documents (IRD), Interface Control Documents (ICD) and Interface Revisions Documents (IR). The IRD defines the functional, performance, and Quality of Service requirements for open systems interfaces. The ICD defines design characteristics and implementation details.

NTIS

Telecommunication; Computer Networks; Procurement; Handbooks

19980015650 General Accounting Office, Resources Community and Economic Development, Washington, DC USA

Testimony Before the Subcommittee on Oversight and Investigations, Committee on Commerce, House of Representatives. Department of Energy: Clearer Missions and Better Management Are Needed at the National Laboratories

Oct. 1997; 15p; In English

Report No.(s): AD-A330535; GAO/T-RCED-98-25; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

DOE manages the federal government's largest research and development system, consisting of about 30 laboratories, with about 58,000 employees and operating budgets of about \$7.5 billion annually. Nine of these are multiprogram National laboratories that account for about 70 percent of DOE's laboratory budget. DOE estimates that it has invested more than \$100 billion in all of its laboratories over the past 20 years. Most of DOE's multiprogram National laboratories were established during or just

after World War II as part of the Manhattan Project, which developed the world's first atomic bombs. These National laboratories have since expanded their missions to encompass civilian research and development in many disciplines-from high-energy physics to advanced computing to human genetics. DOE owns the laboratories but contracts with universities and private-sector organizations for their management and operation. Nearly all of DOE's National laboratories are operated by nonprofit institutions.

DTIC

Fission Weapons; Genetics; Governments; Laboratories; Organizations; Personnel

19980015655 General Accounting Office, General Government Div., Washington, DC USA

Testimony Before the Subcommittee on Government Management, Information and Technology, Committee on Government Reform and Oversight, House of Representatives. The Results Act: Observations on GSA's Strategic Plan

Oct. 08, 1997; 11p; In English

Report No.(s): AD-A330532; GAO/T-GGD-98-14; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Under the Government Performance and Results Act of 1993, executive agencies are to develop strategic plans in which they define their missions, establish results oriented goals, and identify strategies they will use to achieve those goals. The Act specifies that strategic plans should contain six elements: (1) a mission statement; (2) agency-wide long term goals and objectives; (3) approaches (or strategies) and the various resources needed to achieve the goals and objectives; (4) a description of the relationship between the long term goals/objectives and the annual performance plans; (5) an identification of key external factors; and (6) a description of how program evaluations were used to establish and revise strategic goals. GAO'S July 1997 report, The Results Act: Observations on GSA's April 1997 Draft Strategic Plan conveyed GAO'S analysis of the April 1997 version of GSA's draft plan. Since that time, GSA prepared the plan for submission to OMB and Congress on September 30, 1997, as required by the Results Act. This report discusses observations of GSA's strategic plan.

DTIC

Congressional Reports; Reports

19980016030 EOP Foundation, Washington, DC USA

Budgeting for Federal Water Projects Final Report

Gibbons, D., EOP Foundation, USA; Oct. 1997; 112p; In English

Report No.(s): PB98-113582; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This report: provides an overview of total budget and deficit reduction efforts by the Administration and Congress; provides an analysis of historic, present, and expected future budgeting for individual Federal water resource programs and agencies; and addresses the possibilities for more coordinated program and budget development among federal agencies.

NTIS

Budgeting; Water Resources

19980016572 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. fuer Flugfuehrung, Brunswick, Germany

Intelligent Decision Aids for Human Operators

Winter, H., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Champigneux, G., Dassault Aviation, France; Reising, J., Wright Lab., USA; Strohal, M., Universitaet der Bundeswehr Muenchen, Germany; Future Aerospace Technology in the Service of the Alliance; Dec. 1997; Volume 2; 20p; In English; Also announced as 19980016571; Copyright Waived; Avail: CASI; A03, Hardcopy; A02, Microfiche

The paper describes the concepts and architectures of intelligent decision aids, which are designed to support human operators in complex mission systems. It starts with a discussion of models for human decision making. These models are used to develop the concepts for intelligent technical devices - like monitoring or diagnosis systems for situation assessment, planning or decision aiding systems for the preparation of actions - which are built to support certain subfunctions in the human decision making process. Several examples of decision aids are presented, which have been developed in the USA, France and Germany. The goal is that the detailed presentation of these projects, together with the discussion of experiences and lessons learned from the implementations shall help potential builders of intelligent decision aids to design similar systems. The areas of application of these decision aids range from air vehicle management and aircraft mission management to air traffic management and command and control systems. The principle of coupling work systems for the modelling of complex and distributed decision making processes is discussed and applied to air traffic management and command and control.

Author

Decision Support Systems; Human Factors Engineering; Artificial Intelligence; Decision Making; Operators (Personnel); Control Systems Design; Human-Computer Interface; Problem Solving

19980016653 NERAC, Inc., Tolland, CT USA

Time and Motion Studies: Work Measurement and Productivity. (Latest Citations from Information Services in Mechanical Engineering Database)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-856034; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning time and motion studies in the evaluation of productivity in the work force. Data collection methods and evaluations of results are reported. These include productivity assessments, production planning and control, plant design, and physiological and psychological assessments of the work force. Computer aided production control is also considered. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Production Management; Plant Design; Production Planning; Human Factors Engineering

19980016669 NERAC, Inc., Tolland, CT USA

Just In Time Accounting (Latest Citations from the ABI/Inform Database)

Dec. 1995; In English; Page count unavailable

Report No.(s): PB96-855879; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning accounting in a Just In Time (JIT) environment. Topics include production cost accounting, manufacturing performance, management accounting, and manufacturing cycle time reduction. Also discussed are competitive advantages product costing, and scrap reduction through the use of JIT accounting. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Accounting; Bibliographies

19980016777 Department of the Navy, Washington, DC USA

Department of Navy FY 1998/1999 Budget Estimates. Justification of Estimates: Research, Development, Test and Evaluation Budget Activity

Feb. 1997; 671p; In English

Report No.(s): PB97-155055; No Copyright; Avail: CASI; A99, Hardcopy; A06, Microfiche

The report details seven budget activities of the Department of Navy programs on basic research; applied research; advanced technology development; demonstration and validation (DEM/VAL); Engineering and Manufacturing Development (EMD); research, development, test and evaluation (RDTE) management support; and operational systems development.

NTIS

Research and Development; Systems Engineering; Navy; Budgeting; Cost Estimates

19980016799 Environmental Protection Agency, Science Advisory Board, Washington, DC USA

SAB Report: Review of the National Risk Management Research Laboratory (NRMRL)

Sep. 1997; 35p; In English

Report No.(s): PB98-104714; EPA-SAB-EEC-97-011; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

At the request of the Office of Research and Development (ORD), the Environmental Engineering Committee (EEC) of the Science Advisory Board (SAB) conducted a review of the Agency's National Risk Management Research Laboratory's (NRMRL) program. The EEC's charge was to review NRMRL's strategic directions and approach to research within the context of both the 1995 realignment of ORD's organizational structure and its strategic plan.

NTIS

Environmental Engineering; Waste Management

19980016832 Physics and Electronics Lab. TNO, The Hague, Netherlands

Review of the Logistic Processes Concerning Small Weapons to Support the "Arrangement for Single Service Management" in the Dutch Defence Organisation *Inventarisatie van de logistieke processen rondom Klein Kaliber Wapens bij de Defensie-organisatie ten behoeve van de regeling Single Service Management*

Elkhuizen, S. G., Physics and Electronics Lab. TNO, Netherlands; vonBergh, C. J. W., Physics and Electronics Lab. TNO, Netherlands; May 1997; 61p; In Dutch

Contract(s)/Grant(s): A96KL782

Report No.(s): FEL-97-A098; TD97-0097; Copyright; Avail: Issuing Activity (TNO Physics and Electronics Lab., PO Box

96864, 2509 JG, The Hague, The Netherlands), Hardcopy, Microfiche

This report describes the results of a study with the purpose to support the implementation of Single Service Management for small arms in the Dutch Defence-Organisation. Target is to reduce costs by cooperating, in acquisition, maintenance and distribute between the land-force, airforce, navy and military police. Problem is the different procedures and working methods in the current situation. The report contains an overview of logistic and administration processes concerning small arms for all parts of the military force. An analysis of bottlenecks determines the weaknesses in the current situation. to improve the Single Service Management for small arms, a process model is developed that describes the ideal processes. For each category of bottlenecks some new starting-points are agreed. These are the basis for the second stage of the study in which more detailed changes will be worked out.

AIAA

Cost Reduction; Logistics; Resource Allocation; Military Operations; Management Methods; Weapons Delivery

19980016848 Assistant Secretary of Defense (Comptroller), Washington, DC USA

Procurement Programs (P-1), Department of Defense Budget for Fiscal Years 1998/1999

Feb. 1997; 161p; In English

Report No.(s): PB97-133706; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

The Procurement Programs (P-1) exhibit is derived from and consistent with the DoD Future Years Defense Program Procurement Annex data base. The P-1 is provided annually to the DoD oversight committees of the Congress coincident with the transmittal by the President of the Budget of the USA Government. This document is also provided to OASD (PA) for use by non-DoD activities.

NTIS

Government Procurement; Data Bases; Defense Program; Procurement; Procurement Management

19980016849 NERAC, Inc., Tolland, CT USA

Contract Negotiation. (Latest citations from the ABI/Inform Database)

Apr. 1996; In English

Report No.(s): PB96-868237; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning negotiation tactics and practices to achieve contract accord for the provision of leased or purchased equipment, service, and labor or other work. The citations examine elements of the negotiation process, preliminary preparation, and effective bargaining techniques. Also considered are the personality traits that result in superior negotiation success. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Contract Negotiation

82

DOCUMENTATION AND INFORMATION SCIENCE

Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography. For computer documentation see 61 Computer Programming and Software.

19980012514 Xerox Palo Alto Research Center, Computer Science Labs., CA USA

Managing Update Conflicts in Bayou, a Weakly Connected Replicated Storage System

Terry, D. B., Xerox Palo Alto Research Center, USA; Theimer, M. M., Xerox Palo Alto Research Center, USA; Petersen, K., Xerox Palo Alto Research Center, USA; Demers, A. J., Xerox Palo Alto Research Center, USA; Spreitzer, M. J., Xerox Palo Alto Research Center, USA; Aug. 1995; 28p; In English, USA

Report No.(s): PB96-165501; CSL-95-4; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Bayou is a replicated weakly consistent storage system designed for a mobile computing environment that includes portable machines with less than ideal network connectivity. to maximize availability, users can read and write any accessible replica. Bayou's design has focused on supporting application-specific mechanisms to detect and resolve the update conflicts that naturally arise in such a system, ensuring that replicas move towards eventual consistency, and defining a protocol by which the resolution of update conflicts stabilizes. It includes novel methods for conflict detection, called dependency checks, and per-write conflict

resolution based on client-provided merge procedures. This paper presents the motivation for and design of these mechanisms and describes the experiences gained with an initial implementation of the system.

NTIS

Data Base Management Systems; Computer Storage Devices; Replicas

19980012515 National Inst. of Standards and Technology, Gaithersburg, MD USA

Guide to a Format for Data on Chemical Admixtures in a Materials Property Database

Ferraris, C. F., National Inst. of Standards and Technology, USA; Apr. 1996; 31p; In English

Report No.(s): PB96-165394; NISTIR-5796; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This guide is the second in a series of related documents that present recommended formats for use in computerization of concrete materials property data. It addresses the problem of distinguishing one chemical admixture from another by providing a logical scheme for systematically organizing and subdividing material characteristics and parameter to create a unique chemical admixture material identifier. The organization and structure presented in this guide provide a framework for cross-referencing chemical admixture properties, data, and other information which is consistent with reporting recommendations contained in the other ACI Committee 126 guides. ACI Committee 126 guides are consistent with the principles laid down in the standard guides that have been prepared by ASTM Committee E-49. This guide is intended for use by those responsible for entering data into a concrete materials property database or preparing tables of concrete properties and information for use by others.

NTIS

Admixtures; Data Bases; Chemical Properties

19980012516 National Technical Information Service, Springfield, VA USA

NTIS Bibliographic Database Technical Guide for Final Issue File Format (Revised)

Brookshire, T. L., National Technical Information Service, USA; Barney, A. M., National Technical Information Service, USA; Apr. 24, 1996; 73p; In English

Report No.(s): PB96-164603; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The Technical Guide defines the format of the NTIS Final Issue file. It includes brief descriptions and examples of data in each field of the file. The document should be used in conjunction with 'Guidelines for Descriptive Cataloging of Reports, 1985.' (PB-86-112349). The User's Guide is intended primarily for computer programmers who need to know the detail, format and technical information for programming purposes. The NTIS Final Issue file format holds bibliographic data used to announce specialized technical information in 'Government Reports Announcements and Index' (GRA&I). The bimonthly NTIS journal describes reports, journal articles, data files, software and U.S. Government owned inventions. The NTIS Final Issue file is used to edit and publish the GRA&I and NTIS Alerts, and is itself leased by many NTIS customers. Most logical records for a document have 2 or 3 physical 1024 character records. The forty-two data fields begin with a 2 or 3 character tag and end with a field terminator (delimiter).

NTIS

Data Bases; Bibliographies

19980012613 National Inst. of Standards and Technology, Gaithersburg, MD USA

X.500 Directory Schema Design Handbook

Warnar, C. A., National Inst. of Standards and Technology, USA; Tebbutt, J., National Inst. of Standards and Technology, USA; Apr. 1996; 25p; In English

Report No.(s): PB96-183041; NISTIR-5819; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This document contains a high level schema description including a description of the schema components, the storage of schema information in the Directory Information Tree (DIT), and the tailoring of the schema components to meet an organization's needs. Pilot projects and other work in the area of schema design are reviewed and summarized.

NTIS

Data Bases; Information Systems; Directories; Handbooks

19980012763 NERAC, Inc., Tolland, CT USA

Client-Server Networks and Systems. (Latest citations from the INSPEC Database)

Jan. 1996; In English

Report No.(s): PB96-859939; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development and evaluation of client-server networks and systems. Citations discuss client-server architecture, software, databases, environments, computing, maintenance and quality, and testing. Topics include information system architecture, network protocols and security, network operating systems, file and network servers, distributed processing, buffer and virtual storage, failure tolerance and recovery, and remote procedure calls. Applications in business, financial services, medical care, sales management, and personal communication are examined. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Client Server Systems; Bibliographies

19980013046 Joint Chiefs of Staff, Washington, DC USA

Joint Staff FY 1998/FY 1999 President's Budget: Information Technology

Feb. 1997; 30p; In English

Report No.(s): PB97-155022; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Contents include the following: Executive Summary; Report on Information Technology Resources; Information Technology Resources by Functional Area; Core D2 -other, Core D2 - Value Added Services, Military Personnel and Readiness (Training); Descriptive Summary: Joint Modeling and Simulation, Joint Staff Automation for the Nineties, Joint Warfighting Center, Joint Simulation System; Resource Requirements and Indefinite Delivery/Indefinite Quantity Contracts: Joint Staff Automation for the Nineties; and Year 200 Report.

NTIS

Computerized Simulation; Planning; Personnel Development; Information Systems; Federal Budgets; Procurement Management

19980014092 National Inst. of Standards and Technology, Building and Fire Research lab., Gaithersburg, MD USA

Partnership for a National Computer-Integrated Knowledge Systems Network for High-Performance Construction Materials and Systems: Workshop Report

Clifton, J. R., National Inst. of Standards and Technology, USA; Sunder, S. S., National Inst. of Standards and Technology, USA; Mar. 1997; 62p; In English

Report No.(s): PB97-167506; NISTIR-6003; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

A workshop on a National Partnership on Computer-Integrated Knowledge Systems (CIKS) Network for High-Performance Construction Materials and Systems (HPCMS) was held in Gaithersburg, MD on June 13 and 14, 1996. The objectives of the workshop were to identify and prioritize current and future needs of the construction industry for: Universal electronic access to distributed data, information, and knowledge on HPCMS; New applications and/or new ways of using that data, information, and knowledge in (1) material design, processing, selection, and testing; and (2) facility design, construction or installation/applications, operation, maintenance, repair, and disposal; and activities.

NTIS

Information Systems; Conferences; Networks; Construction Materials; Knowledge Based Systems

19980014103 Massachusetts Univ., Dept. of Computer Science, Amherst, MA USA

Browsing, Discovery and Search in Large Distributed Databases of Complex and Scanned Documents *Topical Report, 1 Apr. - 30 Jun. 1997*

Croft, W. B., Massachusetts Univ., USA; Jul. 15, 1997; 9p; In English

Contract(s)/Grant(s): F19628-95-C-0235; ARPA Order D570

Report No.(s): AD-A331110; TR-528181697; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

This project aims to integrate powerful, new techniques for interactive browsing, discovery, and retrieval in very large, distributed databases of complex and scanned documents. Emphasis is placed on going beyond full-text retrieval techniques developed in the DARPA TIPSTER program to support different types of access and non-textual content. These techniques should be particularly relevant to the patent domain where it is important to find relationships between documents and where the patent or trademark may be based on a visual design. The specific tasks identified involve studying representation techniques for long documents with complex structure, browsing and discovery techniques for large text databases, image retrieval and scanned document retrieval techniques, and architectures for large, distributed databases.

DTIC

Data Bases; Data Retrieval; Information Retrieval; Distributed Processing

19980014223 NERAC, Inc., Tolland, CT USA

Data Backup Technology (Latest Citations from the Microcomputer Abstracts Database)

Feb. 1996; In English; Page count unavailable

Report No.(s): PB96-862958; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, development, and implementation of data backup systems. Backup tools, including software routines and magnetic tape recorders, are described. Key backup system management issues are discussed, including unattended backup scheduling and background, or transparent, operation on a non-interference basis. Multiple network server backup configurations are presented. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Backups; Architecture (Computers)

19980014430 Mississippi State Univ., Center for Air Sea Technology, Bay Saint Louis, MS USA

User's Manual for the Naval Interactive Data Analysis System (NIDAS), 3.1

Abbott, Clifton, Mississippi State Univ., USA; Sep. 30, 1997; 81p; In English

Contract(s)/Grant(s): NAS13-564

Report No.(s): AD-A330962; NASA/CR-97-206990; NAS 1.26:206990; CAST-TN-4-97; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This technical note provides the User's Manual for the NIDAS Version 3.1 System Developed for the Naval Oceanographic Office.

DTIC

Manuals; Oceanography

19980014432 Massachusetts Univ., Multimedia Indexing and Retrieval Group, Amherst, MA USA

Retrieving Images by Appearance

Ravela, S., Massachusetts Univ., USA; Manmatha, R., Massachusetts Univ., USA; Jan. 1997; 6p; In English

Contract(s)/Grant(s): ARPA Order D468

Report No.(s): AD-A331082; MM-17; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

A system to retrieve images using a description of the image intensity surface is presented. Gaussian derivative filters at several scales are applied to the image and low order 2D differential invariants are computed. The resulting multi-scale representation is indexed for rapid retrieval. Queries are designed by the users from an example image by selecting appropriate regions. The invariant vectors corresponding to these regions are matched with the database counterparts both in feature and coordinate space. This yields a match score per image. Images are sorted by the match score and displayed. Experiments conducted with over 1500 images of objects embedded in arbitrary backgrounds are described. It is observed that images similar in appearance and whose viewpoint is within small view variations of the query can be retrieved with an average precision of 56%.

DTIC

Information Dissemination; Information Retrieval

19980015131 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Formal Representation of the Logic Embedded in Legal Language

Heather, M., Northumbria Univ., UK; Rossiter, B. N., Newcastle-upon-Tyne Univ., UK; Nov. 1996; 31p; In English

Report No.(s): PB97-140917; TRS-554; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

The processing of normative statements depends heavily on the embedding of higher order logic within natural language. This is a prime component of legal computer science that needs a theoretical basis which can be realized in practice both as good science and as good engineering. Scientific rigour expects the use of mathematics, and the engineering element needs that mathematics to be constructive. Theoretical computer science has recently seen developments in constructive mathematics satisfying these principles with the use of category theory. An example of this formalism is used to represent the normative statement: John gives Mary the ring and title passes on delivery and to show by the use of the adjoint functor theorem the integration of law and logic embedded in natural language as needed in legal computer science.

NTIS

Natural Language (Computers); Operators (Mathematics); Theorems

19980015176 Commerce Dept., Office of Technology Policy, Washington, DC USA

America's New Deficit: The Shortage of Information Technology Workers

1997; 49p; In English

Report No.(s): PB97-210892; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Evidence suggests that the rapidly changing labor market for core information technology (IT) workers--computer programmers, systems analysts, and computer scientists and engineers--is tightening up. The demand for these workers is expected to increase significantly in the coming years, yet it is unclear if the U.S. education system can train enough of them to meet the growing demand. While businesses and other organizations are instituting measures to meet their short term needs, such as aggressive recruiting and training the existing workforce in computer related skills, other actions may be required in the long-term to increase the size of the IT worker pool.

NTIS

Information Systems; Personnel; Education; Commerce; Scientists; Engineers

19980015188 Radian Corp., Austin, TX USA

Gas Research Institute/Railroad Commission of Texas Feasibility Study for Improving Access to Information through Application of Current Information Management Technology and Concepts *Final Report*

Phillips, N. L., Radian Corp., USA; Feb. 1996; 187p; In English

Report No.(s): PB96-155379; DCN-96-660-344-01; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The objectives of this feasibility study were to identify information collected by the Railroad Commission of Texas that has the potential to significantly reduce the costs and risks of oil and gas recovery; and evaluate the benefits and costs of making this economically significant information easily accessible to the industry through the application of current information management concepts and technology. Easier access to this information by the oil and gas consumers, Texas, and the nation. In this study, the benefits to this broad set of stakeholders were identified and quantified to the extent possible. Through a detailed analysis of the Commission's records, coupled with a comprehensive survey of the oil and gas industry on the value of this information for making E&P decisions, a list of high-value information categories to be converted to electronic format was developed. Costs for this conversion, as well as costs for the computer systems needed to access it, were estimated. A recommended solution was then proposed addressing information conversion and information technology.

NTIS

Information Systems; Natural Gas; Industries; Gas Recovery; Management Planning; Oil Recovery; Crude Oil

19980015195 Army Engineer Waterways Experiment Station, Vicksburg, MS USA

A Survey of Tri-Service Environmental Restoration and Compliance Initiatives Using Computer-Aided Design and Drafting (CADD)/Geographic Information System (GIS) Technology *Final Report*

Carpenter, Bobby, Army Engineer Waterways Experiment Station, USA; Gonzales, Steven C., Naval Facilities Engineering Command, USA; Shin, Brian, Naval Facilities Engineering Command, USA; Sep. 1997; 128p; In English

Report No.(s): AD-A331003; WES/TR/CADD-97-1; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This report summarizes the findings of an effort accomplished by the Tri-Service CADD/GIS Technology Center's (Tri-Service Center's) Environmental Field Working Group (FWG) during fiscal year 1996 (FY96) to identify and review Environmental Restoration (ER) and Environmental Compliance (EC) initiatives using Computer-Aided Design and Drafting (CADD) and/or Geographic Information System (GIS) technology. The purpose of this effort was two-fold: (1) Minimize the duplication of effort, encourage communication, and facilitate the transfer of available information and knowledge concerning ER and EC activities between the various Department of Defense (DoD) organizations; and (2) Determine the extent that CADD, GIS, and other computerized technologies are used for accomplishing ER and EC activities, determine training needs, and determine methods for facilitating greater usage of this technology in the future.

DTIC

Computer Aided Design; Geographic Information Systems; Information Systems; Organizations; Reproduction (Copying)

19980015216 NERAC, Inc., Tolland, CT USA

Information Resource Management (IRM). (Latest Citations from the NTIS Bibliographic Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864723; Copyright Waived; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning Information Resources Management (IRM) including the role of the information resource manager in business and industry, and the relationship between information resource management and data processing. Management of information resources by various agencies within the federal government including the Department of Defense, Veterans Administration, Social Security Administration, Department of Energy, Department of the Interior, Food and Drug Administration, Environmental Protection Agency, and Department of Education is presented. Specific IRM long-range plans for acquisitions of Automatic Data Processing (ADP), data communications, telephone, and radio communications equipment and services for various federal agencies are included. (

NTIS

Records Management; Data Processing; Information Resources Management

19980015225 NERAC, Inc., Tolland, CT USA

Distributed Data Base Management Systems. (Latest Citations from the INSPEC Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864558; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design and implementation of distributed database management systems (DBMS). Topics include technology reviews, hardware descriptions, conceptual architecture and design strategies, file organization and allocation, concurrency control, system performance and reliability evaluations, specific system descriptions, and network management. System modeling, and deadlocking studies are also considered.

NTIS

Bibliographies; Data Base Management Systems; Design Analysis; Reliability; Evaluation

19980015334 Goeteborg Univ., Dept. of Education and Educational Research, Sweden

Design of Learning Environments for IT-Users

Holmberg, L. M., Goeteborg Univ., Sweden; 1996; 22p; In English

Report No.(s): PB96-173232; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Contents include the following: Background; Summary of the studies; The thoughts and practices of documentation developers; A content analysis of nine user documentations on operating systems; The design of a learning environment for users of an accounting information system; Comments and concluding remarks; The design process; The design product - the learning environment; and Conditions for further development of the design of learning environments for IT-users.

NTIS

Management Information Systems; Learning

19980015338 NERAC, Inc., Tolland, CT USA

Database Systems. (Latest Citations from the US Patent Bibliographic File with Exemplary Claims)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-864798; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning database system design and management. Relational, object-oriented, distributed, and knowledge-based systems are described. References cover data processing, storage, and retrieval. Topics include database cataloging, database copying and updating, access control, paging systems, intelligent systems, document editing and printing, and client-server systems.

NTIS

Patents; Bibliographies; Systems Engineering; Data Base Management Systems

19980015385 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Unifying Theory for Content Self-Awareness in Distributed Multimedia Publishing

Heather, M., Newcastle-upon-Tyne Univ., UK; Rossiter, B. N., Newcastle-upon-Tyne Univ., UK; Feb. 1997; 37p; In English

Report No.(s): PB97-179774; TRS-574; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

A formal abstract theory of indexing for multimedia objects leads to the concept of machine awareness, presented in the context of constructive database models and drawing on the latest results using category theory. Geometric logic can provide a univer-

sal representation in mathematics of concepts such as objects, limits, adjunctions, and Heating implications, all needed to deal with closure over open document contexts in hypermedia.

NTIS

Multimedia; Training Devices

19980015387 Newcastle-upon-Tyne Univ., Dept. of Computing Science, Newcastle, UK

Toolkit for Constructing Distributed Object-Oriented Metainformation Systems

Calsavara, A., Newcastle-upon-Tyne Univ., UK; Shrivastava, S. K., Newcastle-upon-Tyne Univ., UK; Nov. 1996; 30p; In English Report No.(s): PB97-141006; TRS-557; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Stabilis is a programming tool for the construction of distributed object-oriented metainformation systems whose main purpose is to deliver powerful and reliable object query services in large-scale distributed environments. Metainformaion consists of a catalogue with an object-oriented structural description of information and corresponding indices to information objects. This permits queries to be formulated in a highly structured fasion, thus exploiting semantic knowledge about information. Information objects are external to Stabilis and can be any entity that contains information, including the resources available on the Internet. The notion of views is also supported in order to permit organizing the information space according to user needs, such as topic-specific information. Transactional access is employed to obtain consistency, and replication is employed to obtain high availability and scalability. Stabilis is implemented as an extensible C++ class library atop a distributed transaction facility named Arjuna. The authors describe Stabilis using as an example a system for querying about bibliographical references which has been constructed as a demonstration application.

NTIS

Catalogs (Publications); Object-Oriented Programming; Internets

19980015420 Army Command and General Staff Coll., Fort Leavenworth, KS USA

Express Lanes and Potholes of the Information Superhighway: The Internet and the Operational Planner

Koba, Michael G., Army Command and General Staff Coll., USA; May 22, 1997; 60p; In English Report No.(s): AD-A331269; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This study investigates the Internet as a potential tool as well as a threat to the operational planner. The Internet is changing how information is stored, processed, transmitted and utilized. The Internet is affecting the way people and nations interact and conduct business. As a global network , the Internet transcends National borders and allows an expanded collective awareness of events, issues and concerns. This monograph reviews the history and functions of the Internet, and reviews some of the many varied sources available to the operational planner through the Internet. The ease of access the Internet offers into the global information environment has a direct impact on the ability to suppress, sensor, limit or otherwise control information. Some governmental reactions to and policies for the Internet are reviewed. The employment of the Internet by advocacy groups, social movements and transNational actors is also covered for a perspective on how the Internet is being employed. The study concludes that the Internet holds unique potential for the operational planner. The Internet may also pose dangers that operational planners need to be informed about. Operational planners should become familiar with the functions and capabilities of the Internet.

DTIC

Internets; Communication Networks

19980015433 National Inst. of Standards and Technology, Systems and Network Architecture Div., Gaithersburg, MD USA

Guidelines for the Evaluation of Electronic Data Interchange Products

Garguilo, J. J., National Inst. of Standards and Technology, USA; Markovitz, P., National Inst. of Standards and Technology, USA; Feb. 1996; 63p; In English

Report No.(s): PB96-172325; NIST/SP-500/231; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Electronic Data Interchange (EDI) is defined as the computer-to-computer exchange of standardized business information. As with most software products, EDI products can differ greatly. The host of options potentially present in an EDI product can make purchasing the 'right' one a difficult task. This document assists the reader in determining which EDI product, among many candidate products, best meets the reader's requirements. Specifically, this document addresses: (1) EDI product fuctionality, (2) EDI product performance, and (3) the integration of EDI products into the business process.

NTIS

Information Systems; Telecommunication; Commerce; Evaluation; Computer Programs

19980015442 Goeteborg Univ., Dept. of Education and Educational Research, Sweden

Design of a Learning Environment for Users of an Accounting Information System: Theoretical Foundations and an Empirical Study

Holmberg, L. M., Goeteborg Univ., Sweden; 1996; 266p; In English

Report No.(s): PB96-173240; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

This paper contains the following: Introduction; Learning as a situated activity; Learning environments in business organizations; The process of designing learning environments; A rejoinder; Systems design; Human-computer interaction; Management information systems; Bricolage; Problem demarcation and purpose with the empirical study; Methodological rationale; Accounting information systems; The learning environment (results); The design of the learning environment (results); Learning (results); Discussion of the results; and Concluding remarks.

NTIS

Management Information Systems; Accounting; Information Systems; Systems Engineering

19980015755 NERAC, Inc., Tolland, CT USA

Active Databases. (Latest Citations from the INSPEC Database)

Feb. 1996; In English; Page count unavailable.

Report No.(s): PB96-863683; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning software development, functionality, and implementation of active databases and systems. References examine active object-oriented database management systems. Active rule bases, behavior, execution, and evaluation are discussed. Applications cover travel reservation systems, information management systems, computational linguistics, and robot vision. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Data Bases; Data Base Management Systems

19980016029 Carnegie-Mellon Univ., Dept. of Computer Science, Pittsburgh, PA USA

Predicting Data Cache Misses in Non-Numeric Applications Through Correlation Profiling

Mowry, Todd C., Carnegie-Mellon Univ., USA; Luk, Chi-Keung, Toronto Univ., Canada; Sep. 1997; 27p; In English; Sponsored in part by InterNational Business Machines and Canadian Commonwealth Fellowship

Report No.(s): AD-A332313; CMU-CS-97-175; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Software-based latency tolerance techniques offer the potential for bridging the ever-increasing speed gap between the memory subsystem and today's high-performance processors. However, to fully exploit the benefit of these techniques, one must be careful to apply them only to the dynamic references that are likely to suffer cache misses-otherwise the runtime overheads can potentially offset any gains. In this paper, we focus on isolating dynamic miss instances in non-numeric applications, which is a difficult but important problem. Although compilers cannot statically analyze data locality in non-numeric applications, one viable approach is to use profiling information to measure the actual miss behavior. Unfortunately, the state-of-the-art in cache miss profiling (which we call summary profiling) is inadequate for references with intermediate miss ratios-it either misses opportunities to hide latency, or else inserts overhead that is unnecessary. To overcome this problem, we propose and evaluate a new profiling technique that helps predict which dynamic instances of a static memory reference will hit or miss in the cache: correlation profiling. Our experimental results demonstrate that roughly half of the 22 non-numeric applications we study can potentially enjoy significant reductions in memory stall time by exploiting at least one of the three forms of correlation profiling we consider: control-flow correlation, self correlation, and global correlation. In addition, our detailed case studies illustrate that self correlation succeeds because a given reference's cache outcomes often contain repeated patterns, and control-flow correlation succeeds because cache outcomes are often call-chain dependent. We also demonstrate that software prefetching can achieve better performance on a modern superscalar processor when directed by correlation profiling rather than summary profiling information.

DTIC

Data Acquisition; Technology Utilization; Memory (Computers); Computer Storage Devices

19980016563 National Biological Service, Environmental Management Technical Center, Onalaska, WI USA

Long Term Resource Monitoring Program. Geospatial Application: A Geographic Information System Interface Designed for Use in River Management

McConville, D. R., Saint Mary's Coll., USA; Owens, T. W., National Biological Service, USA; Redmond, A. S., Illinois Natural History Survey, USA; Jul. 1996; 39p; In English

Report No.(s): PB97-103584; LTRMP-96-T003; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A pilot geographic information system (GIS) graphical user interface (GUI) was designed to facilitate habitat rehabilitation and enhancement planning by the U.S. Army Corps of Engineers, St. Louis District. Undertaken in summer 1993, the project was developed to provide sample analyses for the Calhoun Point Habitat Rehabilitation and Enhancement Project on Pool 26 of the Upper Mississippi River System. The main objective of the project was to show how a GIS can assist in the design and evaluation of a project. The interface allows users to become familiar with the features of the area from a contemporary as well as a historical perspective, conduct statistical summaries, and develop and test varying modeling scenarios involving dike placement and water level elevations. In operation, the user sets the analysis environment by selecting, through a series of menus, the elements needed for analysis, including the land cover layer, management plan, and elevations.

NTIS

Geographic Information Systems; Graphical User Interface; Management Planning; Mississippi River (US); Summer; Water

19980016743 Environmental Protection Agency, Office of Information Resources Management, Washington, DC USA

Information Systems Inventory (ISI), October 1995

Oct. 1995; 174p; In English

Report No.(s): PB95-227146; EPA/220/B-95/008; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

The Agency's Information Systems Inventory (ISI) contains information on EPA's current information system as well as some models and data bases, and is the definitive source of summary information about EPA systems. The ISI was developed to enhance the Agency's ability to track major information systems and share information across media and program boundaries. For each system in the inventory, the following information is collected and maintained: system name and acronym, system level, responsible organization, contact person, legislative authorities, databases descriptors, access information, hardware and software, system abstract, and key words.

NTIS

Computer Programs; Indexes (Documentation); Information Systems

19980016750 National Inst. of Standards and Technology, Systems and Software Technology Div., Gaithersburg, MD USA

Defining Environment Integration Requirements

Cuthill, B., National Inst. of Standards and Technology, USA; Zerkowicz, M., National Inst. of Standards and Technology, USA; May 1995; 34p; In English

Report No.(s): PB96-131545; NISTIR-5654; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper discusses the use of enterprise and process modeling to classify the features of the enterprise process, its automation and the external stimuli on the enterprise that effect enterprise choices for tool and environment integration. This report focuses on the use of metadata and message types as mechanisms for integrating environments. This report includes an example of generating metadata and messaging requirements in the software development domain.

NTIS

Software Engineering; Information Systems; Requirements; Messages; Integrated Energy Systems

19980016762 Department of the Air Force, Washington, DC USA

Department of Defense, Department of the Air Force Information Technology Budget FY 1997 Budget Estimates

Mar. 1996; 100p; In English

Report No.(s): PB96-178710; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

The Air Force continues to provide a balanced Information Technology (IT) program while making major strides in meeting critical base communications connectivity and Information Warfare needs. Air Force IT advancements center directly on three major goals: shaping tomorrow's Air Force, maintaining combat readiness, and supporting quality of life. Major emphasis is placed on transitioning from current to future readiness through prudent investment in modernization efforts. Increased IT funding in the FY 1997 Budget Estimates submission reflects tough choices made by the Air Force in meeting future C4I warfighting needs.

NTIS

Defense Program; Information Systems; Warfare; Communication; Budgeting; Armed Forces (USA)

19980016812 National Inst. of Standards and Technology, Distributed Systems Engineering, Gaithersburg, MD USA

Sharing Information via the Internet: An Infoserver Case Study

Bagwill, R. H., National Inst. of Standards and Technology, USA; Nov. 1995; 28p; In English

Report No.(s): PB96-131511; NISTIR-5757; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A variety of proprietary systems are available from commercial vendors, but the most rapid deployment of electronic document distribution has been by systems on the Internet using software based on open standards. This report describes some of the experiences of the Distributed Systems Engineering Group has had employing this software.

NTIS

Information Dissemination; Deployment; Internets; Systems Engineering; Data Bases

83

ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

19980013645 NERAC, Inc., Tolland, CT USA

Cost-Benefit Analysis: Guidelines, Techniques and Measurements. (Latest citations from the ABI/Inform Database)

Jan. 1996; In English

Report No.(s): PB96-859632; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning cost-benefit analysis. Citations discuss performance and value of the analysis in decision-making processes. Guidelines, techniques, practices, and measurement of cost-benefit analysis are given. Applications of this decision analysis procedure to current technologies and management methods are included.

NTIS

Bibliographies; Cost Effectiveness; Technology Utilization; Cost Analysis; Beneficiation

19980013926 Physics and Electronics Lab. TNO, The Hague, Netherlands

Application of Simulation Within Training Courses of the Royal Netherlands Navy Final Report Toepassingsmogelijkheden van simulatiemiddelen binnen opleidingen van de Koninklijke Marine

deBock, J. J. P. R., Physics and Electronics Lab. TNO, Netherlands; Gouweleeuw, R. G. W., Physics and Electronics Lab. TNO, Netherlands; Aug. 1997; 78p; In Dutch

Contract(s)/Grant(s): A95/KM/763

Report No.(s): AD-A332928; FEL-97-A053; TD97-0102; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This report answers the questions (1) what are the applications for simulators in general and for the Royal Netherlands Navy in particular? and (2) how can a simulator be incorporated as a sound decision in the training trajectory? A distinction is made between simulator training, training with operational systems and conventional training. Furthermore, the report contains results of interviews with the schools of the RN1N to sketch the current situation and the future expectations with respect to education and training.

DTIC

Navy; Training Simulators

19980014102 Science Applications InterNational Corp., McLean, VA USA

Arctic/North Pacific Ocean Environmental Studies Final Report, 30 Jun. 1993 - 30 Jun. 1997

Mikhalevsky, Peter, Science Applications InterNational Corp., USA; Jun. 1997; 4p; In English

Contract(s)/Grant(s): N00014-93-C-0217

Report No.(s): AD-A331113; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The project began in 1993 as a effort to design and construct an Arctic capable low frequency acoustic source at 20 Hertz with acoustic power of 195-200 dB. The objective of the effort was to test the feasibility of acoustic monitoring of the Arctic Ocean and ice cap using long range low frequency acoustic propagation, by answering the fundamental questions: (1) What source level would be required to reliably propagate at 20 Hertz across the Arctic Basin?, (2) Will the Arctic acoustic channel be stable enough to permit precise phase and/or travel time measurements?, and (3) Will modes/rays be stable, identifiable and predictable? The design study of Arctic capable acoustic sources was completed in December 1993 and a decision was made to go forward with the manufacture of an acoustic source by the Institute of Applied Physics, Nizhny Novgorod, Russia. The results of the design study by the Institute of Applied Physics are included in this report. It was also decided to support a experiment in the Arctic in April 1994 to be known as the Transarctic Acoustic Propagation (TAP) Experiment. The objectives of the experiment would be to test the acoustic source and the hypotheses of acoustic monitoring of the Arctic Ocean.

DTIC

Acoustic Propagation; Acoustics; Arctic Ocean; Arctic Regions; Sea Ice; Sound Transmission

LAW, POLITICAL SCIENCE AND SPACE POLICY

Includes NASA appropriation hearings; aviation law; space law and policy; interNational law; interNational cooperation; and patent policy.

19980015390 NERAC, Inc., Tolland, CT USA

Reengineering. (Latest Citations from the Manufacturing Technology Database)

Mar. 1996; In English; Page count unavailable.

Report No.(s): PB96-863998; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning reengineering to improve performance by redesigning an organization. Reengineering is the reorganization of work processes, organizational structure, information technology, job content, and manufacturing flow to increase productivity. Citations examine case studies, guidelines, and theoretical applications.

NTIS

Bibliographies; Industrial Management; Productivity; Performance Prediction

19980015413 National Archives and Records Service, Office of Federal Register, Washington, DC USA

Code of Federal Regulations: Aeronautics and Space, Title 14

Jan. 01, 1997; 345p; In English

Report No.(s): PB97-165997; No Copyright; Avail: CASI; A15, Hardcopy; A03, Microfiche

This paper contains the following sections: Explanation; Title 14, Chapter I-Federal Aviation Administration, Department of Transportation (Continued); Finding Aids, Material Approved for Incorporation by Reference; Table of CFR Titles and Chapters; Alphabetical List of Agencies Appearing in the CFR; and List of CFR Sections Affected.

NTIS

Regulations; Air Transportation; Aeronautics

URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation. For related information see also 03 Air Transportation and Safety, 16 Space Transportation, and 44 Energy Production and Conversion.

19980012719 Massachusetts Univ., Transportation Center, Amherst, MA USA

Use of Electronic and Optical Data Acquisition Techniques in Transportation Planning and Management *Final Report, Sep. 1993 - Aug. 1994*

Shuldiner, Paul W., Massachusetts Univ., USA; Woodson, Jeffrey B., Massachusetts Univ., USA; May 1996; 19p; In English
Report No.(s): PB97-137285; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The current state-of-practice employing video and machine vision technologies to acquire and analyze license plate images is evaluated. Both fixed installations, such as at tollbooths, and mobile setups along expressways and surface arterials are considered. Examples are presented of various applications, including: cordon-line origin-destination surveys; link-by-link travel time distributions; micro-scale origin-destination patterns; movements within complex interchanges, and; designing and monitoring use of high occupancy vehicle lanes. Field procedures, resource requirements and the statistical validity of the results of various applications are discussed.

NTIS

Transportation; Planning; Computer Vision; Data Acquisition

19980013899 NASA Lewis Research Center, Cleveland, OH USA

Ultra-Capacitor Energy Storage in a Large Hybrid Electric Bus

Viterna, L. A., NASA Lewis Research Center, USA; Dec. 1997; 12p; In English; 14th; InterNational Electric Vehicle Symposium and Exposition, 11-17 Dec. 1997, Orlando, FL, USA; Sponsored by Electric Vehicle Association of America, USA

Contract(s)/Grant(s): RTOP 251-30-07

Report No.(s): NASA/TM-1997-206319; NAS 1.15:206319; E-11012; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The power requirements for inner city transit buses are characterized by power peaks about an order of magnitude larger than the average power usage of the vehicle. For these vehicles, hybrid power trains can offer significantly improved fuel economy and exhaust emissions. A critical design challenge, however, has been developing the energy storage and power management system to respond to these rapid power variations. Most hybrid vehicles today use chemical energy storage batteries to supplement the power from the fuel burning generator unit. Chemical storage batteries however, present several difficulties in power management and control. These difficulties include (1) inadequate life, (2) limited current delivery as well as absorption during regenerative braking, (3) inaccurate measurement of state of charge, and (4) stored energy safety issues. Recent advances in ultra-capacitor technology create an opportunity to address these concerns. The NASA Lewis Research Center, in cooperation with industry and academia, has developed an advanced hybrid electric transit bus using ultra-capacitors as the primary energy storage system. At over 15,000-kg gross weight, this is the largest vehicle of its kind ever built using this advanced energy storage technology. Results of analyses show that the vehicle will match the performance of an equivalent conventionally powered vehicle over typical inner city drive cycles. This paper describes the overall power system architecture, the evolution of the control strategy, and analysis of power flow and vehicle performance.

Author

Capacitors; Energy Storage; Electric Motor Vehicles; Urban Transportation

19980014440 Federal Highway Administration, Turner-Faibank Highway Research Center, McLean, VA USA

Characterizing Roadside Hardware Materials for LS-DYNA3D Simulations Final Report, Dec. 1994 - Apr. 1996

Wright, A. E., Federal Highway Administration, USA; Ray, M. H., Federal Highway Administration, USA; Feb. 1997; 119p; In English

Report No.(s): PB97-135826; FHWA/RD-96/108; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Finite element models have three parts: geometry, connections and material properties. Being the visible parts of a model, geometry and connections are generally carefully considered. Material properties are often not chosen with the same degree of care although they are every bit as important to obtaining good results. Accurate simulations of vehicles impacting roadside hardware require an understanding of both the material behavior and the mathematical material models in LS-DYNA3D. A method for comparing LS-DYNA3D simulations to typical ASTM materials tests is described. Material input properties for w-beam guardrail steel, guardrail posts, flanged-channel sign posts and Ford Festiva fenders are found for LS-DYNA3D based upon experimental quasi-static tests. Strain-rate sensitive material models in LS-DYNA3D are explored.

NTIS

Finite Element Method; Transportation; Steels; Computerized Simulation; Mathematical Models; Traffic Control

19980015412 Texas A&M Univ., ITS Research Center Center of Excellence, College Station, TX USA

Effect of Telecommunications Deregulation on the Deployment of Intelligent Transportation Systems in Texas and at the Texas-Mexico Border

Pincus, M. L., Texas A&M Univ., USA; Jun. 1997; 39p; In English

Report No.(s): PB97-180004; TTI/ITS RCE-97/03; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In 1996, the U.S. and Mexico passed legislation to deregulate their telecommunications industries. In both countries, telecommunication deregulation dramatically changed the nature of the competitive relationships between telecommunications service and equipment providers, as well as changing the nature of the market in general. These changes will affect the development and use of individual telecommunications technologies, and will also affect the nature of public-private partnerships for the research, development, and deployment of Intelligent Transportation Systems (ITS), particularly at the U.S.-Mexico border. Regulatory changes in the telecommunications sector will affect many of the technologies that form the foundation of ITS, and will also change the nature of the market for telecommunications services and equipment. This study explores in a non-technical fashion the major provisions of both Telecommunications ACTS and how each may affect the research and eventual deployment of ITS at the National and state level. This study also specifically addresses how deployment of ITS in the U.S. -Mexico border region may be affected by the interaction of two simultaneously changing telecommunications markets.

NTIS

Market Research; Telecommunication; Transportation

19980015629 National Science Foundation, Arlington, VA USA

Science and Engineering Indicators, 1996

Bond, J. S., National Science Foundation, USA; 1996; 653p; In English

Report No.(s): PB96-185905; NSB-96-21; No Copyright; Avail: CASI; A99, Hardcopy; A06, Microfiche

Continued investment in science and technology is critical to protecting our nation's economic growth, the vitality of our industries, the productive use and husbanding of our resources, and the health and well being of our people. This report contributes to a better understanding of this nation's science and technology capabilities and helps to illuminate the importance of our investment in research and education and of strengthening the ties between them. In an era of increased emphasis on assessment of government and university performance and industrial benchmarking, this report provides decisionmakers and analysts in both the public and private sectors with a broad base of quantitative information and analysis regarding science, engineering, research, and education in the USA. Additionally, the Indicators report offers valuable comparative information on science and technology in other countries - the result of long-term collaborative efforts to support the continuous improvement and comparability of international data sources.

NTIS

USA; Research and Development; Education; Engineering

19980016689 Technical Research Centre of Finland, Espoo, Finland

VTT's Annual Report, 1996 *Annual Report, 1996*

1997; 37p; In English

Report No.(s): PB97-191399; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Partial Contents: VTT's Mission and Core Values; Review by the Director General; Review by the Board; VTT's Operating Units; VTT Electronics; VTT Information Technology; VTT Automation; VTT Chemical Technology; VTT Biotechnology and Food Research; VTT Energy; VTT Manufacturing Technology; VTT Building Technology; VTT Communities and Infrastructure; and VTT Information Service, Supporting Services, and the Group for Technology Studies.

NTIS

Finland; Biotechnology; Information Systems; Research and Development

90

ASTROPHYSICS

Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust. For related information see also 75 Plasma Physics.

19980016703 NERAC, Inc., Tolland, CT USA

Cosmology. (Latest Citations from the NTIS Bibliographic Database)

Dec. 1995; In English; Page count unavailable.

Report No.(s): PB96-856117; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning theories and explorations into the origin of the universe. Citations focus on various genesis models including perturbation, unified field and string theories. Large scale structure of the universe, galactic evolution, quantum gravity, dark matter, black holes, entropy, Feynman diagrams and multi-dimensional systems represent areas of coverage. The citations include theoretical investigations and astronomical observations. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Cosmology; Galactic Evolution

19980016751 Naval Postgraduate School, Monterey, CA USA

Optimal Impulse conditions for Deflecting Earth Crossing Asteroids

Elder, Jeffrey T., Naval Postgraduate School, USA; Jun. 1997; 114p; In English

Report No.(s): AD-A333446; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

An analysis of the effects of small impulses on Earth impacting asteroids is presented. The analysis is performed using a numerical routine for an exact, two body, analytic solution. The solution is based on two dimensional, two body, Earth intersecting elliptical orbits. Given the asteroid eccentricity, time prior to impact and impulse magnitude and direction, an analysis of impulse to minimum separation distance is generated. Impulse times prior to impact from zero to a few orbits are considered. The analysis is presented as three dimensional plots of minimum separation distance as a function of impulse magnitude, direction, and time prior to impact. The general result is that for long lead times the optimal impulse occurs at the perihelia of the asteroid's orbit in

the direction of the velocity vector, in the orbital plane. For short lead times the optimal impulse direction becomes more normal to the velocity vector, in the orbital plane, as the asteroid approaches the Earth.

DTIC

Rendezvous Trajectories; Earth Orbits; Asteroids; Crossings; Elliptical Orbits

19980016895 Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette, France

Tensor-Scalar Gravity and Binary-Pulsar Experiments

Damour, T., Institut des Hautes Etudes Scientifiques, France; Esposito-Farese, G., Institut des Hautes Etudes Scientifiques, France; Mar. 1996; 38p; In English

Report No.(s): PB96-163159; IHES/P/96/13; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Some recently discovered nonperturbative strong-field effects in tensor-scalar theories of gravitation are interpreted as a scalar analog of ferromagnetism: 'spontaneous scalarization'. This phenomenon leads to very significant deviations from general relativity in conditions involving strong gravitational fields, notably binary-pulsar experiments. Contrary to solar-system experiments, these deviations do not necessarily vanish when the weak-field scalar coupling tends to zero. We compute the scalar 'form factors' measuring these deviations, and notably a parameter entering the pulsar timing observable gamma through scalar-field-induced variations of the inertia moment of the pulsar. An exploratory investigation of the confrontation between tensor-scalar theories and binary-pulsar experiments shows that nonperturbative scalar field effects are already very tightly constrained by published data on three binary-pulsar systems.

NTIS

Gravitation; Neutron Stars; Gravitational Fields; Pulsars

91

LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design or space stations see 18 Spacecraft Design, Testing and Performance.

19980012508 NERAC, Inc., Tolland, CT USA

Galileo Missions. (Latest citations from the INSPEC Database)

Jan. 1996; In English; Page count unavailable.

Report No.(s): PB96-857230; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning Galileo missions to the Jovian system. Infrared mapping of the Jovian system and multispectral imaging of Earth are examined. The flight performance of the Galileo orbiter is discussed.

NTIS

Bibliographies; Galileo Project; Infrared Imagery; Mapping; Flight Characteristics

19980013153 NERAC, Inc., Tolland, CT USA

Cassini Mission. (Latest citations from the Ei Compendex*Plus database)

Jan. 1996; In English; Page count unavailable.

Report No.(s): PB96-856505; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the Cassini mission to the Saturnian system. Topics include radar instrumentation, altimetry, and model testing, and reference the Voyager and Galileo missions. The interplanetary trajectory design process is discussed.

NTIS

Bibliographies; Cassini Mission; Data Bases; Models; Research Vehicles

19980016866 Brown Univ., Dept. of Geology, Providence, RI USA

Planetary Volcanism Final Report

Antonenko, I., Brown Univ., USA; Head, J. W., Brown Univ., USA; Pieters, C. W., Brown Univ., USA; 1998; 20p; In English
Contract(s)/Grant(s): NAGw-2185

Report No.(s): NASA/CR-1995-207059; NAS 1.26:207059; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The final report consists of 10 journal articles concerning Planetary Volcanism. The articles discuss the following topics: (1) lunar stratigraphy; (2) cryptomare thickness measurements; (3) spherical harmonic spectra; (4) late stage activity of volcanoes on Venus; (5) stresses and calderas on Mars; (6) magma reservoir failure; (7) lunar mare basalt volcanism; (8) impact and volcanic glasses in the 79001/2 Core; (9) geology of the lunar regional dark mantle deposits; and (10) factors controlling the depths and sizes of magma reservoirs in Martian volcanoes.

CASI

Mars Volcanoes; Venus (Planet); Volcanology; Lunar Geology; Earth (Planet)

92

SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots. For related information see 93 Space Radiation.

19980012529 California Univ., San Diego, La Jolla, CA USA

The Physics of Remotely-Sensed Heliospheric Plasmas *Final Report, 15 Nov. 1993 - 14 May 1997*

Jackson, Bernard V., California Univ., San Diego, USA; Aug. 1997; 27p; In English

Contract(s)/Grant(s): AF-AFOSR-0091-91; AF Proj. 2311

Report No.(s): AD-A332663; AFOSR-TR-97-0638; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Solar disturbances produce major effects on the corona, the solar wind, the interplanetary medium, and the Earth along with its magnetosphere. New techniques have been developed under this grant for studying plasma disturbances in the inner heliosphere by remotely sensing them. These techniques have used data from the HELIOS spacecraft zodiacal light photometers, in situ data and a variety of other spacecraft and ground-based instruments. The zodiacal-light photometers on board the two HELIOS spacecraft (data coverage from 1974 to 1986) provided the first reliable information about the heliospheric masses and shapes of propagating disturbances. The investigations into the physics of the disturbances sensed by these techniques, and the ability to forecast them, have been underway during the contract.

DTIC

Heliosphere; Solar Wind; Interplanetary Medium; Solar Corona; Solar Cosmic Rays

19980016865 Brown Univ., Dept. of Geological Sciences, Providence, RI USA

Tectonic Processes on Planets and Satellites *Final Report*

Head, J. W., Brown Univ., USA; 1997; 14p; In English

Contract(s)/Grant(s): NAGw-1873

Report No.(s): NASA/CR-1997-207060; NAS 1.26:207060; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The final report is comprised of 7 journal articles that were completed during the reporting period. Topics covered include: (1) photogeologic analysis of the Magellan stereo view of six coronae; (2) the ancient age of Maxwell Montes; (3) timescale of regional plains emplacement on Venus; (4) remote and local stresses and calderas on Mars; (5) lunar linear rilles; (6) stratigraphical constraints on the duration of tessera formation on Venus; and (7) the use of magnetic signatures in identifying shallow intrusions on the Moon.

CASI

Lunar Topography; Natural Satellites; Photogeology; Tectonics; Stratigraphy; Mars Surface; Venus Surface

93

SPACE RADIATION

Includes cosmic radiation; and inner and outer earth's radiation belts. For biological effects of radiation see 52 Aerospace Medicine. For theory see 73 Nuclear and High-Energy Physics.

19980015367 NERAC, Inc., Tolland, CT USA

Antimatter. (Latest citations from the INSPEC Database)

Jan. 1996; In English

Report No.(s): PB96-859384; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning physical theory, testing, and practical applications of antimatter. Related nuclear phenomena, matter-antimatter interactions, relativity, antigravity, formation of the universe, and space-time configurations are described. The roles of cosmic rays, black holes, antiprotons, and positrons are discussed. Antimatter propulsion spacecraft are briefly cited. (Contains 50-250 citations and includes a subject term index and title list.)

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Bibliographies; Antimatter; Cosmology

99 GENERAL

19980014815 Office of Science and Technology, Washington, DC USA

Science and Technology: Shaping the Twenty-First Century: A Report to the Congress *Biennial Report*

1997; 146p; In English

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In accordance with the National Science and Technology Policy, Organization, and Priorities Act of 1976, the Office of Science and Technology Policy (OSTP) prepares a biennial report to the Congress on science and technology. This report addresses the President's policy for maintaining the Nation's interNational leadership in science and technology, developments and Federal actions of National significance in science and technology; currently important National issues that are affected by science and technology; and opportunities for using science and technology and associated human resources to achieve Federal program objective and National goals.

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Research and Development; Technologies; Technology Utilization; Technology Assessment

19980015118 Nanjing Univ. of Aeronautics and Astronautics, Nanjing, Jiangsu, China

Transactions of Nanjing University of Aeronautics and Astronautics, Volume 13, No. 2, Dec. 1996

Zhang, A., Nanjing Univ. of Aeronautics and Astronautics, Nanjing, China; Guo, R., Nanjing Univ. of Aeronautics and Astronautics, Nanjing, China; Yang, Z., Nanjing Univ. of Aeronautics and Astronautics, Nanjing, China; Zhu, Z., Nanjing Univ. of Aeronautics and Astronautics, Nanjing, China; Sun, P., Nanjing Univ. of Aeronautics and Astronautics, Nanjing, China; Dec. 1996; 111p; In English

Report No.(s): PB97-136527; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Contents include the following: Theoretical and Experimental Research; Research Bulletins; and Academic Notes.

NTIS

Aerospace Engineering; Research and Development; Computer Aided Design; Algorithms

19980015218 Tokyo Inst. of Tech., Precision and Intelligence Lab., Yokohama, Japan

Bulletin of Precision and Intelligence Laboratory, September 1995, No. 70

Mar. 1995; 150p; In English

Report No.(s): PB96-129960; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This document consists of a review entitled, Two dimensional arrayed Photonic devices toward ultra-parallel optoelectronics; a paper entitled, A visual model of object location with the optimal viewpoint and visual fields; and a series of abstracts covering Advanced information processing, Advanced microdevices, Precision machine devices, Advanced mechanical systems, Advanced materials and Silence amenity engineering.

NTIS

Microelectronics; Optoelectronic Devices; Information Systems; Research and Development

19980016145 National Research Lab. of Metrology, Sakura, Japan

Bulletin of NRLM, Volume 44

1995; 68p; In English; In Japanese; Original contains color illustrations

Report No.(s): PB96-127519; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Topics considered include: Microwave leakage in a primary Cs atomic beam frequency standard; A compact laser interferometer with a piezodriven scanner for metrological measurements in regular SEMs; Material characterization using a frequency-doubling two-color interferometer; Strong-field effects in coherent saturation spectroscopy of atomic beams; Simultaneous 3-D imaging using chirped ultrashort optical pulses; and Velocity distribution in a very low speed wind tunnel.

NTIS

Metrology; Atomic Beams; Frequency Standards

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